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SURGICAL NURSING.

FULLERTON.

3.

FIFTH REVISED EDITION. JUST READY.

A HANDBOOK
OF
OBSTETRIC NURSING.

Comprising the Course of Instruction in Obstetric Nursing
given to the Pupils of the Training School for Nurses
connected with the Woman's Hospital of Philadelphia.

BY ANNA M. FULLERTON, M.D.,

*Clinical Professor of Gynecology in the Woman's Medical College of
Pennsylvania; Obstetrician, Gynecologist, and Surgeon to
the Woman's Hospital of Philadelphia.*

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SURGICAL NURSING

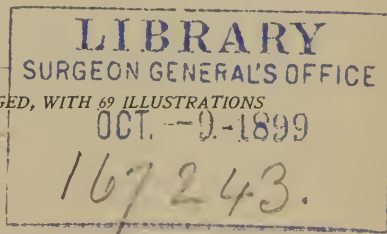
A COMPILATION OF THE LECTURES UPON ABDOMINAL SURGERY,
GYNÆCOLOGY, AND GENERAL SURGICAL CONDITIONS AND
PROCEDURES, DELIVERED TO THE CLASSES IN THE TRAIN-
ING SCHOOL FOR NURSES CONNECTED WITH THE
WOMAN'S HOSPITAL OF PHILADELPHIA

BY

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PENNSYLVANIA; OBSTETRICIAN, GYNÆCOLOGIST, AND SURGEON
TO THE WOMAN'S HOSPITAL OF PHILADELPHIA

THIRD EDITION, REVISED AND ENLARGED, WITH 69 ILLUSTRATIONS



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TO
The Woman's Hospital of Philadelphia,
WHERE MANY WOMEN,
BOTH PHYSICIANS AND NURSES,
HAVE BEEN TRAINED FOR EFFICIENT SERVICE
IN THE CARE OF THE SICK,
I RESPECTFULLY DEDICATE
THIS BOOK

PREFACE TO THIRD EDITION.

The present edition of this work, which formerly appeared under the title "Nursing in Abdominal Surgery and Diseases of Women," includes a consideration of nursing requirements in General Surgery as well, hence the change in the title.

Much space has been given to expounding the principles which form the foundation of success in all *aseptic wound surgery*, and detailed directions are given regarding preparations for operative procedures. An effort has been made to treat the subjects of *disinfection*, *sterilization*, *preparation of ligature and suture materials*, and *dressings* exhaustively, as also that of the *management of surgical complications*.

Such lectures, with a few on general anatomy, the exhibition of the various forms of surgical instruments and apparatus referred to, and demonstrations which illustrate the proper methods for their use, supply, I think, every essential for the theoretical training of the

surgical nurse. The practice which makes perfect she can only acquire in thoroughly equipped surgical wards, under the tuition of intelligent and experienced supervisors.

The appended *dietary for the sick* has kindly been prepared by Miss Sara H. Janvier, diet matron of the Woman's Hospital. I also desire to acknowledge the valuable assistance given me in the revision of this work by Miss Mayou, Chief Nurse of the Woman's Hospital.

ANNA M. FULLERTON.

123 S. 16th St., Philadelphia,
August, 1899.

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“So kind, so duteous, diligent,
So tender over (her) occasions, true,
So feat, so nurse-like!”

SHAKESPEARE'S "CYMBELINE," IV, 5.

“Ask God to give thee skill in comfort's art
That thou mayst consecrated be and set apart
Unto a life of sympathy;
For heavy is the weight of woe in every heart,
And comforters are needed much of Christ-like touch.”

UNKNOWN.

NURSING
IN
ABDOMINAL SURGERY
AND
DISEASES OF WOMEN.

CHAPTER I.

• THE SURGICAL NURSE.

“A perfect nurse,” says the surgeon, J. Grieg Smith, in his work on “Abdominal Surgery,” “is a perfect woman, rarely to be had.” There are possibilities of perfection, however, in every human being of average health and ability. Both men and women fail oftener in attaining a high degree of excellence in character and work from *indolence* rather than *incompetence*.

Energy of will is largely a matter of self-discipline, and it is one of the first requisites to success in nursing as in other professions.

A serene, sunny disposition is another important

qualification in a good nurse, for it serves to produce an atmosphere of quiet content in the sick-room which conduces greatly to the comfort and well-being of the patient, as of all concerned.

Self-forgetfulness, sympathy, cheerfulness, patience, tact, quickness of observation, method and skill in action, implicit obedience and loyalty to her physician—all of which are so essential to the good nurse—are the fruit of long and careful self-discipline combined with practical experience.

The surgical nurse should be habituated to the sight of blood. She should be strong-nerved and of steady hand. Sudden emergencies should not throw her off her guard. Thorough training and a knowledge of the conditions which may demand prompt action on her part will enable her to attain the necessary self-possession. Knowledge gives courage. Skill is gained by practice. For the acquirement of knowledge and skill it is essential that the surgical nurse should have a course of training in the wards of a hospital where considerable surgical work is done.

So much does the success of a surgeon's work depend upon the nurse that extreme care should be exercised in the selection of a suitable person to undertake the supervision and after-care of an operative case.

It is to be hoped that the training-schools of our country will greatly increase the number of nurses fitted to assume these important trusts.

Personal cleanliness is essential in every nurse. This

does not imply a simple adherence to the ordinary rules for bathing and general care of the person. "Surgical cleanliness aims at the removal of microscopic particles," hence requires a thorough appreciation of the principles of asepsis and antiseptics. The danger of a nurse's carrying disease from one patient to another makes it imperative that her entire body, including her hair, should receive a thorough cleansing between the different cases she may nurse. After the general bath of warm water and soap, the surface of the body should be washed with an antiseptic solution: as, corrosive sublimate (1:1000); Labarraque's solution of chlorinated soda (1 part to 8 of water); or carbolic solution (1:40). The chlorinated soda solution should not be used on the hair, because of its bleaching effect. The irritation of the skin produced by any of the antiseptic washes may be prevented by a subsequent plunge or sponge bath of simple warm water.

The *costume* of a nurse is another matter of great importance. Apart from its being neat and clean, the entire costume should consist of wash materials, to insure its being free from contagion. Without previous washing no articles of dress should be worn in attendance upon two different cases.

Care of Clothing.—Clothing worn at a contagious case should be allowed to soak in an antiseptic solution from one to two hours before its subjection to the ordinary processes of the wash.

Care should be taken to rinse out the antiseptic solu-

tions very thoroughly before boiling the clothing, as the chemical agents ordinarily used might otherwise produce discoloration. Corrosive sublimate (1:1000) and carbolic solution (1:20) are the agents usually employed. A preparation which has been satisfactorily employed in many hospitals for washing infected clothing is the following: Four ounces of sulphate of zinc and two ounces of common salt dissolved in one gallon of water. The clothing may be boiled in this for half an hour and lie in the solution from four to five hours.

The bleaching effect of chlorine prevents the use of this for colored clothing. Boiling the clothing for half an hour would cause its thorough disinfection, but as care should be taken not to subject those who attend to the washing to danger from infection, and since many laundresses can not be trusted to boil the clothing, it is a safe plan to subject it to this double process of cleansing. The methods of disinfection for various articles will be more thoroughly dwelt upon in another chapter. I touch upon the matter here in order to impress the nurse with the fact that a thorough disinfection of herself is as important as that of her patient and his surroundings.

During an operation the nurse should wear an entirely fresh suit of clothing, and, if she is obliged to handle sponges, or to so assist the surgeon as to come in contact with him or the patient, a large clean apron should be put on and the sleeves rolled up above the elbows, after all things else are in readiness for the operation. The

especial precautions to be taken in the preparation of the nurse's hands for her work are as follows:

The nails should be kept closely cut, the hands smooth and soft, that they may not feel rough to the patient as they come in contact with her skin. Cold cream or a little glycerine rubbed over the hands at night, or, if the skin be irritated by pure glycerine, a wash consisting of bay rum ($\frac{2}{3}$) and glycerine ($\frac{1}{3}$) is soothing.

Work properly done does not spoil the hands, provided the precaution be taken, after washing them, to dry them thoroughly, and to anoint them as suggested, when rough.

Should the nurse's hands come in contact with foul discharges, a first cleansing with soap and cold water will best help to remove the odor. If this is insufficient, flaxseed meal or dry mustard flour rubbed thoroughly over the hands will effect the purpose. Warm water with soap may then be used with a nail brush for more thorough removal of all particles of dirt, and then some antiseptic, as chlorinated soda or bichloride of mercury. In the special cleansing of the hands for surgical work various methods may be followed. Thus, after a thorough cleaning with soap and water for several minutes, the nail-brush being carefully used, the hands may be immersed in an antiseptic wash, which is similarly thoroughly applied, by means of a nail-brush, around the finger-nails, etc. Pure alcohol may be used, or corrosive sublimate solution 1:1000, or Labarraque's solution 1:8.

A method employed in the Woman's Hospital for sterilizing the hands is described as follows: Ten minutes are spent in washing the hands, finger-nails, and fore-arms with green soap or the tincture of green soap and warm water and a moderately stiff scrubbing brush. After washing thoroughly in water and soap, the hands are next immersed in a saturated solution of permanganate of potash, and held there until they are uniformly deeply stained; from this they are transferred to a saturated solution of oxalic acid, which removes the stain in one minute. It is well, following the immersion in oxalic acid, to wash the hands in sterilized lime-water, to counteract the irritating effect of the acid. They are then dipped in plain water (sometimes, following this, in alcohol), and finally laid in a bath of bichloride of mercury (1 : 1000) for a full minute.

Care of Breath.—A nurse should keep her breath sweet. The existence of a bad catarrh will incapacitate her for surgical nursing. The mouth and teeth and the digestive organs should also receive the attention they demand, so that the patient may suffer no annoyance from their effect upon the breath.

General Health.—It should not be necessary to remind a nurse of the importance of attention to her own health. An earnest purpose to attain the highest success in her work should lead every nurse to so dispose of her hours of leisure as to keep herself in the best working order. "This one thing I do," should be her motto; and food and drink, clothing, rest, and recreation should

be so adjusted as to train her for active duty, and for the strain which must often come to her in the long vigils of the sick-room, when every sense should be acute to discover the slightest change in the sufferer, and every faculty fully alive to the demands of the moment. Acute conditions demanding the almost constant presence of the nurse seldom last longer than a few days, and a well-trained nurse can ordinarily bear the strain very well for that length of time. Should the critical condition be protracted, it may be necessary to have a division of labor by association with another nurse.

It is so much more satisfactory for one nurse to manage a case throughout that, unless it is imperative, such an arrangement for sharing work should be avoided. The assistance of some reliable member of the family, at times when the patient is not requiring very especial attention, will often permit a most trying case to be carried through with but one nurse's supervision.

The simplest and most wholesome food and drink, regular outdoor exercise, sufficient sleep at a time when sleep is legitimate, good sense in the matter of dress, occasional change of scene and thought in the intervals between cases, will help to keep a nurse in good condition for duty.

CHAPTER II.

THE GERM THEORY OF DISEASE.

In order to thoroughly understand the importance of the minute details to be observed in surgical nursing, it is essential that the nurse should know something of the researches of modern science, which have developed what is called the "germ theory of disease."

"**Germ**s," or "**bacteria**," are forms of vegetable life so minute as to be singly invisible to the naked eye. Numerous forms of bacteria have, however, been carefully examined and studied through the microscope, and scientists have thus in recent years learned much of their nature and activities. These researches have proved a most valuable contribution to the science of medicine, for through them it has been found that many of the most deadly processes of disease are due to the irritating presence of special germs, and to the changes which they bring about in the human body as a result of the action of certain products to which they give rise, known as *ptomaines*.

The causation of disease as induced by these minute organisms, and its prevention by suitable management, are subjects of so great importance that scientific workers all over the world are devoting time to the

study of bacteria, with the hope of eventually exterminating some of the present most fatal maladies. Thus, consumption, typhoid fever, cholera, diphtheria, and pneumonia are due to germs, each disease having its own specific cause. The same may be said of surgical diseases—the complications which may arise in the healing of wounds: as, inflammations, abscesses, erysipelas, and the various forms of blood-poisoning.

Description of Bacteria.—Bacteria exist almost everywhere. They have the power of nourishing themselves by using certain portions of dead organic material, leaving the rest in such form as to be used by other living things. Some of them also have the power of moving. They all reproduce their kind. Warmth, moisture, and a certain amount of organic matter are the conditions which favor their development. Most, but by no means all, forms of bacteria require air; some, however, can develop only in the absence of air.

Where the conditions are favorable, they may increase with great rapidity. The process of reproduction in some forms is as follows: One of the bacteria grows a little longer, a constriction forms about the middle, which finally becomes a complete partition, so that two distinct individuals are thus formed. These similarly divide to produce other bacteria, and their number thus multiplies. These separate bacteria may fall apart or cling together in chains or in masses. Other forms of these organisms grow by *spore*-formation. A central spot, or spore, forms within the rod. The rod opens and the

spore drops out and subsequently develops and propagates its kind. The figures giving us the estimate of the rapidity with which they reproduce themselves seem almost fabulous. Thus, it has been authentically stated that a single germ, by the process of growth, may in twenty-four hours give rise to more than sixteen and a half million germs.

Bacteria are of *various shapes*; the most frequent are : (1) The round (micrococci); (2) straight rods (bacilli); and (3) twisted rods or spirals (spirilli). Some distinguish under a distinct class the rod-like germs with rounded ends, calling them microbacteria. To give an idea of their size it has been said of one of the most common forms of bacteria (a little rod), that were fifteen hundred of them put end to end, they would scarcely reach across the head of an ordinary pin.

The different *species* of bacteria are very numerous. The *pathogenic* are those which affect adversely the health of plants or animals, causing specific disease, as diphtheria, typhoid fever, cholera, blood-poisoning, etc. The non-pathogenic are not productive of injurious results. These organisms are to be found wherever any form of life can exist—in water, in the atmosphere, in the soil, in our food and drink, especially that which is uncooked; in all the orifices and canals of our own bodies which communicate with the air; wherever dust can go or collect, there are bacteria of various forms in greater or smaller numbers.

When the bacteria are dry, they are said to be inactive,

as they are not capable of increasing and multiplying as they do where moisture and the special food they need are present. Of the special forms of bacteria which are apt to infect wounds, it has been found that there are two particular species which give the most trouble in the majority of cases. These are round in shape and are called *micrococci*. One species in growing forms chains and is called streptococcus; the other forms clusters like bunches of grapes, and is called staphylococcus.

Both these forms of bacteria exist very abundantly in dirty places, even where healthy people live, but especially where the sick are crowded together. Therefore, they are especially to be guarded against in hospitals.

They are found floating in the air or resting with the dust upon any surface exposed to the air. When dust falls upon the open surface of a wound, or any object upon which bacteria rest comes in contact with such a surface, these living organisms lodge in the wound, and if not destroyed, grow there, forming poisonous materials called "ptomaines," which interfere with the proper healing of the wound. Poisonous materials may even thus gain access to the blood and be carried to distant parts of the body, where they continue to develop. The whole system may then become infected with the poison, causing serious and often fatal results. The *symptoms* which result from the absorption of septic material are chills, high temperature, sometimes delirium, nausea, vomiting, diarrhea, and general collapse, which may terminate in death.

Inflammation.—In the occurrence of inflammatory complications in the healing of wounds, pus in greater or less quantity is apt to be produced. For this reason the bacteria causing such complications are called *pus-forming* or *pyogenic* bacteria.

Purpose in Nature.—This representation of the irritating nature of bacteria under especial conditions is not intended to convey the idea that they are entirely destructive in their tendency. Like all things else in nature, bacteria have a special purpose to serve. They break or tear up worn-out material and thus get it in readiness for new uses—much as a pair of scissors will rip up an old garment and get it in readiness for re-fashioning. Only the bacteria, unlike the scissors, accomplish this work of separating the particles of matter by appropriating to themselves certain substances which serve for their own nutrition.

It is only when the condition of the body, or any part of the body, is such as to favor the rapid multiplication of germs that diseased conditions may be induced.

Liability to Infection.—If the standard of health is maintained by due attention to physiological and sanitary principles, even those liable by heredity to special forms of disease may do much to resist the deleterious effects induced by the presence of germs.

We would, therefore, in this connection remind the nurse of the subtle influences of sunlight, fresh air, good food, cleanliness, and cheerfulness, which will enable her, in the care of the severest cases of illness, to success-

fully meet and resist the attacks of the unseen but ubiquitous foe.

Weak and debilitated persons, and those suffering from injuries which have resulted in the loss of vitality of certain tissues, are most prone to develop poisonous effects from the presence of germs. It is this fact that renders the employment of aseptic and antiseptic measures of such great importance.

Suppuration in a wound ; *septicæmia*, or the absorption of putrid matters into the blood ; *pyæmia*, or the form of blood-poisoning which is accompanied by the formation of metastatic abscesses in various parts of the body, are conditions of such great danger to a patient that every effort should be made to avert them.

Wound-healing is effected by a reparative process of nature, and is accomplished in one of two ways: first, by *first intention* ; second, by *granulation*.

When the edges of a wound are clean-cut and can be accurately brought together and are entirely free from microbic infection, union by *first intention*, or *fibrinous repair*, takes place. A small amount of fibrin or lymph, which exudes from the cut surfaces, glues the parts together, and then becomes changed into tissue similar to the structures united.

To obtain this, the parts must be kept quiet and free from all irritation. Healing is accomplished in from two to seven days.

When there is loss of substance, or the edges of the wound are ragged, so that they can not be accurately

brought together, or should they fail to unite in consequence of the occurrence of suppuration, union by *second intention*, or *granulation*, must take place—the spaces being filled with minute granular bodies of pinkish coloration, which are formed from the tissues. These granulations are converted into bluish-white connective tissue, called the *cicatrix*. The process may require weeks if the wound or ulcer is a large one, and it may leave a large, unsightly scar, sometimes giving rise to deformity.

The term *union by third intention* has been applied to the adhesion of two granulating surfaces which are brought in apposition.

CHAPTER III.

ASEPSIS AND ANTISEPSIS.

The word "clean" is derived from an old Saxon term, *claene*, which signifies "to open, to remove, to separate." The term "cleanliness," therefore, implies a condition of absolute freedom from all extraneous or foreign matter.

Surgical cleanliness refers more particularly to the absence of all germs of putrefactive change.

The words "aseptic" and "antiseptic," so constantly used by the surgeons of the day, come from a Greek root—the word *septos*, meaning "putrid." *Asepsis* means literally "without putrefaction." The germs of putrefactive change may never have been present, or if once present, should have been entirely destroyed in any object which is termed "aseptic." Wherever putrefaction of organic matter occurs, certain poisonous substances called *ptomaines* are produced, which are productive of *blood-poisoning* if found in the body.

Antisepsis means "against sepsis or putrefaction," and comprises the means or methods by which objects may be rendered "aseptic." Any substance in which all germs have been destroyed by antiseptic measures is said to be "*sterilized*," because the germs have been ren-

dered incapable of doing further injury by continued reproduction.

Methods of Sterilization.—The application of a *high degree of heat—dry or moist*—and the use of certain *chemical agents* constitute the measures by which germs may be rendered harmless. In *aseptic surgery*, although in the preparation of the patient, the operator's hands, the site of the wound, the clothing, etc., chemical agents may have been employed to bring about surgical cleanliness, during the operation no chemical substances are employed; filtered boiled water is used, and dressings which have been prepared by superheating. Aseptic surgery is, as a rule, preferred in abdominal operations. In *antiseptic surgery* (which is better adapted to surface wounds) solutions of one or more of the several antiseptic substances are used for preparation of the site of the wound, irrigation, and dressings.

Sterilization by Heat.—In sterilizing inanimate things heat is generally employed. Instruments, towels, clothing, etc., may thus be sterilized by either *dry* or *moist* heat. In the use of dry heat it is essential to attain a temperature considerably above the boiling-point of water—at least 230° F. (110° C.). In the disinfection of articles supposed to contain spores (the seeds or eggs of bacteria) it is well to employ this degree of heat for *two hours*. Furnaces or ovens of special design are employed for sterilization by this means, as also for the use of steam under pressure. In the latter case the temperature should be raised to 221° F.

(105° C.). For office or hospital work instruments must be kept constantly ready for use, and a small sheet-iron oven, heated by gas, such as is used for bacteriological work, may be employed. This is provided with a thermometer and with a thermostat, by which the flow of gas is automatically controlled, so that the heat is maintained within known limits. The instruments should be subjected to this heat for about *one hour*.* With *steam*, which is more penetrating than dry heat, *ten to fifteen minutes* is sufficient for purposes of sterilization. It is not uncommon, however, for greater security, to leave the articles in the steamer longer, as for a *half hour*.

Boiling in water, or, preferably, in a one per cent. soda solution, for the same length of time (for ten to fifteen minutes) is also sufficient, unless the article be bulky, when it is well to extend the time to a half hour. The Arnold steam sterilizer is perhaps the most convenient arrangement for the sterilization of instruments, towels, etc., and is now in use in most hospitals. It consists of a pan, which contains the water to be heated, communicating with a closed chamber in which the steam accumulates. The articles to be sterilized are placed in this chamber. A double lid is arranged for the prevention of escape of steam. (See Fig. 9.)

* Dry heat is more injurious to instruments than moist, especially to such as have sharp cutting edges, which are rendered dull and unserviceable in a short time.

Sterilization of Water.—Water itself is rendered aseptic by filtering and boiling, or distilling and boiling. Distilled water should be entirely aseptic, but its manufacturers rarely appreciate the minute details of asepsis

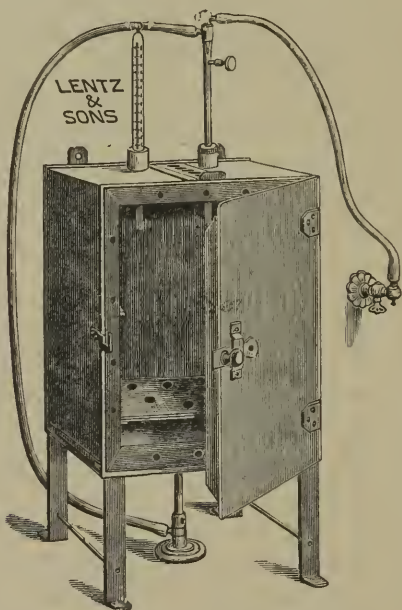


FIG. 1.—DRY STERILIZING OVEN.

sufficiently to take proper precautions to prevent contamination. Hence, even when distilled water is employed for an operation, it is well for the nurse to take the precaution of boiling it in vessels which she knows

to be clean. Water thus sterilized is made fit for contact with open wounds. Neither rain water nor melted ice will serve as a substitute for water thus prepared, as they are not free from germs.

Antiseptics.—In the many cases in which heat can not be used, as in the sterilization of living tissues, chemical agents are employed in solutions of suitable strength, or in the form of powder, for the purpose of destroying germs or rendering them inert. The agents thus used are termed “antiseptics,” and may be employed according to their properties and the strength of their solutions, for one of two purposes,—either as *germicides*, true germ-killers, or as *inhibitory agents*—that is, as substances which check the activity of germs and thus prevent their injurious action. True *germicides* are so poisonous that they can not be used except in very dilute solutions when brought in contact with living tissues. In fact, even dilute solutions have been known to cause poisoning by absorption; hence more and more in wound surgery the use of boiled distilled water or boiled filtered water is replacing the use of antiseptic solutions. Especially is this the case in the surgery of the internal organs. The use of antiseptic washes is more frequent in the treatment of surface wounds accompanied by a foul discharge.

Antiseptic agents in sufficient strength to be germicidal are, therefore, only used for the destruction of germs in putrescent substances outside the body. Thus, *typhoid stools*, *diphtheritic discharges*, etc., should be

rendered innocuous by the strongest germicides available. Such use should be kept entirely distinct from their application in wound surgery.

The following list gives those most commonly employed:

For Spore-containing Material.—

- (a) Chloride of lime solution, 4 per cent., made by adding 6 ounces to the gallon of water. This is not so certain in its results as bichloride of mercury, and has to be freshly made and requires much longer exposure to the action of the antiseptic.
- (b) Bichloride of mercury (corrosive sublimate) solution 1 : 500—that is, 15 grains to the pint.

For Refuse.—

- (a) Chloride of lime in powder is a good disinfectant for sprinkling over masses of organic material in privy vaults, etc. It has been estimated that about one pound of chloride of lime is required for every thirty pounds of such material. Should corrosive sublimate be used for the purpose, one pound of the powder for every 500 pounds of fecal matter will be sufficient.
- (b) Slaked lime in the proportion of about one per cent.—that is, one pound to the hundred of the material to be treated, has been shown to be an efficient germicide.
- (c) Copperas (sulphate of iron), or green vitriol, in the proportion of $1\frac{1}{2}$ pounds to a gallon of water, is a valuable agent for the arrest of putrefactive de-

composition, being readily available because of its low price.

- (d) Chloride of zinc in the proportion of 6 ounces to 4 gallons of water may be used for the same purpose.

These substances are all of great value where it is impossible to remove filth from the vicinity of houses, but they are a poor substitute for cleanliness.

For Sick-room Discharges.—

- (a) Corrosive sublimate (1 : 500), 15 grains to the pint of water, or (1 : 1000) $7\frac{1}{2}$ grs. to a pint of water.
(b) Chloride of lime (4 per cent.), 5 drams to the pint.
(c) Carbolic acid (5 per cent.), about $\frac{3}{4}$ of an ounce to the pint.
(d) Sulphate of iron, or copperas (5 per cent.), about $\frac{3}{4}$ of an ounce to the pint. The corrosive action of copperas on wood must be borne in mind in its use, and solutions employed not allowed to drip on wood-work in a room.

For Underclothing, Bedding, etc.—*Underclothing, bedding, etc.*, if infected, are best destroyed by fire, if of little value.

To disinfect them, we may employ—

- (a) Boiling for at least a half hour.
(b) Boiling for half an hour in a solution of 4 ounces sulphate of zinc, 2 ounces common salt, to 1 gallon of water.
(c) Immersion for three or four hours in a solution of corrosive sublimate, 1 : 1000.

- (d) Immersion in a five per cent. carbolic solution for the same length of time.

To avoid the discoloring effects of these solutions, clothing taken from them should be thoroughly rinsed out in clear water before it is sent to the laundry.

For Outer Garments.—*Outer garments*, which would be injured by boiling water or a disinfecting solution, may be sterilized—

- (a) By exposure to dry heat at a temperature of 230° F. (110° C.).
(b) By the steaming process in a suitable apparatus.
(c) By subjection to formaldehyde vapor in a room or closet filled with the fumes. Leather or furs can not be sterilized by heat, but may be subjected to fumigation by formaldehyde.

For Mattresses and Blankets.—*Mattresses* and *blankets* should be disinfected in the same way, preferably by formaldehyde. If these means are not available, mattresses may have their covering removed and washed and boiled separately, the contents, if hair, being immersed in boiling water for a half-hour.

For Furniture, Floors, etc.—*Furniture, floors, wood-work*, painted walls, etc., of a room should be washed with either—

- (a) Corrosive sublimate solution (1 : 1000), which is most efficient as a germicide, but which darkens the surface to which it is applied.
(b) Carbolic acid solution, two per cent.
(c) Boric acid solution, three per cent.

(d) Aqua ammonia, $\frac{1}{2}$ of an ounce to a gallon of water.

The last two are least injurious to the surfaces washed with them.

For Rooms.—*Rooms* are sometimes disinfected by *burning sulphur* in the proportion of at least three pounds for every thousand cubic feet of air space. To secure any good results, close the apartment as closely as possible by stopping up all apertures through which the gas might escape by means of wet rags, which may be stuffed into the cracks around doors, windows, etc. The sulphur is put into a deep tin pan, which is placed upon two bricks, in a tub partly filled with water, in the middle of the room. A little alcohol may be poured on the sulphur, which is then set on fire, or a few live coals placed in the pan. The fumes should be kept in the apartment from twelve to twenty-four hours, after which doors and windows should be thrown open, and it should be subjected to free ventilation. All surfaces in the room are then washed off with one of the above-mentioned solutions.

Formaldehyde.—The generation of formaldehyde gas in definite quantities for the disinfection of houses, rooms, furniture, and bedding, etc., is a later-approved method. Different forms of apparatus have been devised for generating formaldehyde gas. Whatever apparatus is used, it is essential that the vapors generated shall be in real gaseous form and in a superheated state. Formalin pastilles, each containing 15.4 grains, may be used to gen-

erate the gas. Two pastilles are required for each cubic meter of air space.

All the windows and doors of the room to be disinfected should be closed; also all large openings, as radiators, chimneys, etc. The closing of very small cracks and openings is unnecessary, as the formaldehyde gas is heavy and does not readily escape from a room. Articles in the room, as linen, quilts, blankets, etc., should be stretched out on a line in order that as much as possible of their surface shall be exposed to the action of the fumes. Books should be suspended by their covers, so that the pages are open and fully exposed. Mattresses placed so that the fumes will penetrate them thoroughly. All bureau-drawers opened. The gas is introduced into the closed room through the keyhole of the door, into which the outlet tube from the generator is carried; or one form of lamp may be placed in the room itself, the fumes being generated by the burning of wood-alcohol, which passes through a platinum plate.

To open up a room containing formaldehyde fumes, sprinkle or spray some aqua ammonia in the room and formalin is precipitated as a white powder, making it possible to enter the room without discomfort.

Surface of the Body.—For the disinfection of the *surface of the body*, after a thorough wash with soap and warm water, use may be made of—

- I. Absolute alcohol, as in cleansing the hands (too expensive for general use).
- II. Solution of corrosive sublimate, 1 : 1000.

III. Solution of chlorinated soda, 1 : 10.

IV. Carbolic acid solution, two per cent.

V. Saturated solution of permanganate of potassium, followed by the saturated solution of oxalic acid. This should be used for the hands alone, according to the method described in the chapter on the Surgical Nurse.

VI. Formalin solution, two per cent.

For Open Wounds and Pus-secreting Surfaces.

—*Open wounds* or raw surfaces are cleansed, preferably, with boiled distilled water or normal salt solution. When dirt has entered the wound or pus has formed, showing the presence of germs, we may use—

(a) Solution of corrosive sublimate, 1 : 4000, 1 : 5000, etc.

(b) Carbolic solution, two per cent.

(c) Formalin solution, one-half of one per cent.

A preparation used considerably for pus-secreting cavities and surfaces is peroxide of hydrogen (hydrogen dioxide). It acts by oxidizing the tissues irrigated. The compound is so unstable that, unless the bottle containing it be kept very firmly and securely corked in the intervals of its use, it will lose its virtue. It is well, also, to keep a bottle that has been opened standing bottom upward. It should always be kept in a dark, cool place, and should not be shaken violently. It should never be employed in cavities from which it does not find a ready exit.

For Surgical Dressings.—For *surgical dressings* we do not so much need germicides as *inhibitory agents*.

The various gauzes as ordinarily prepared with bichloride of mercury, boric acid, carbolic acid, eucalyptus, salicylic acid, etc., serve this purpose, as does the use of iodoform, aristol, or boric acid in powder.

Bichloride of mercury, or corrosive sublimate gauze, is very generally used. To prepare it the gauze is allowed to soak for an hour in a sud of soft soap, to remove all "sizing." It is then wrung out of clear water several times until the soap is well out of it, and is immersed in a solution of corrosive sublimate, 1 : 100 (75 grains to the pint of water), or a weaker solution, as 1 : 1000, may be used. It is then dried in an oven. As drying the gauze in this way, especially if the temperature of the oven be raised high enough to bake it, has the effect of rendering it non-absorbent, it is desirable either to sprinkle a little glycerine over the layers of gauze before drying, or to put a small quantity in the corrosive sublimate solution used in its preparation. After this process the gauze should be kept carefully from dust and contamination by contact with unsterilized substances. It may be rolled in an antiseptic towel for this purpose, and kept in a closed box or drawer.

Iodoform Gauze.—Methods for preparing iodoform gauze vary somewhat, but the following formula is very satisfactory: Six ounces of a one per cent. solution of carbolic acid and sterilized water should be prepared, to which is added sufficient Castile soap to make a sud. Twelve drams of iodoform powder should be thoroughly mixed with this. Three yards of gauze, previously steril-

ized by steaming, baking, or boiling, may be prepared by saturating with this mixture. A basin (graduated) and glass rod, which have been previously sterilized, should be used in the making of the mixture and the preparation of the gauze. In drying this gauze in the oven a little glycerine will need to be sprinkled over it to prevent its becoming non-absorbent. The gauze may be cut and preserved in glass jars while moist.

Sterilized gauze is prepared by wrapping in towels or placing in bags and keeping in the steam sterilizer for one hour for the first day and a half-hour on the two successive days. It should not be removed from the towels or bags until required for use. If part of the contents of the bag have been removed, all the rest should be resterilized before use.

For Instruments.—After *surgical instruments* have been rendered aseptic by thorough cleansing with soap and water, followed by the process of *baking*, *steaming*, or *boiling*, they may be kept free from contamination during an operation by lying immersed under—

- (a) Sterilized water.
- (b) Carbolic acid solution, two per cent., or 1 : 40. The blacking effect of carbolic acid may be prevented by adding glycerine to the solution.
- (c) Lysol (one per cent. solution) makes a very nice bath for instruments, which may lie six hours in the solution without discoloration.

The use of iodide of mercury as an antiseptic—a substance used in the same manner as corrosive sublimate

—need scarcely be mentioned. The solutions are more troublesome to prepare and no more efficient, hence their use is limited. Various other substances have been used for antiseptic purposes, but those mentioned here are the most frequently and universally employed.

Injurious Action of Antiseptics.—In the preparations of solutions of corrosive sublimate, chlorinated lime, and copperas, it should be remembered that they have an injurious effect upon metal; hence should be mixed in glass, porcelain, or agate vessels. Large quantities of solution of chlorinated lime may be made in a bucket.

These rules concerning the use of antiseptics should be thoroughly understood by every good nurse, for even the surgeons who employ aseptic methods, as a rule, require the use of antiseptics beforehand, to bring about a perfect state of asepsis for the operation, and to enable the aseptic state to be preserved after the operation.

RULES FOR MAKING UP SOLUTIONS.

To prepare solutions of a certain percentage of strength, the following rule is sufficiently accurate to serve as a guide for work:

Multiply the figure standing for the percentage of strength by 5 and the product is about the number of grains to the ounce.

Thus, to make a 3 per cent. boric acid solution the following computation can be made:

$3 \times 5 = 15$, representing the number of grains to an ounce of water.

15×16 (the number of ounces in a pint) $= 240$.

$240 \div 60 = 4$, representing 4 drams boric acid to the pint of water.

The accurate compounding of a solution would require both the weight of the solvent and the chemical to be ascertained, but this must be done by the apothecary and is essential only when very active preparations are used.

When the number of grains to an ounce of the preparation is known and we wish to know the percentage of strength, divide the number of grains to the ounce by 5; the quotient will represent the percentage of strength. When 4 drams of carbolic acid have been used to a pint of water, we have 15 grains to the ounce. Dividing 15 by 5 $= 3$, representing the percentage. This would give us a 3 per cent. solution of carbolic acid.

In making up solutions of bichloride of mercury, which is an exceedingly poisonous substance, it must be remembered that $7\frac{1}{2}$ grains by weight to 1 pint of water will give us the strength of 1:1000. With this solution as a base, the weaker solutions may be made by adding the requisite amount of water. Thus, a pint of a solution of bichloride of mercury of the strength 1:1000, if diluted by the addition of another pint of plain water, would become a solution of 1:2000. The addition of two pints of water would make it 1:3000, etc.

CHAPTER IV.

ABDOMINAL SECTION.

The operation of abdominal section consists in the making of an incision through the walls of the abdomen, by which the surgeon is enabled to perform any operation required upon the organs contained in the abdomen or the pelvis.

The abdominal organs are :

The stomach.

The intestines.

The liver and gall-bladder.

The kidneys and ureters.

The spleen.

The pancreas.

The pelvic organs are :

The uterus, or womb.

The Fallopian tubes.

The ovaries.

The bladder.

The rectum.

All these organs are subject to disease, to injuries the result of accidents, and to the development of new growths termed "tumors." Hence it may be seen that an abdominal section may be undertaken for very varied

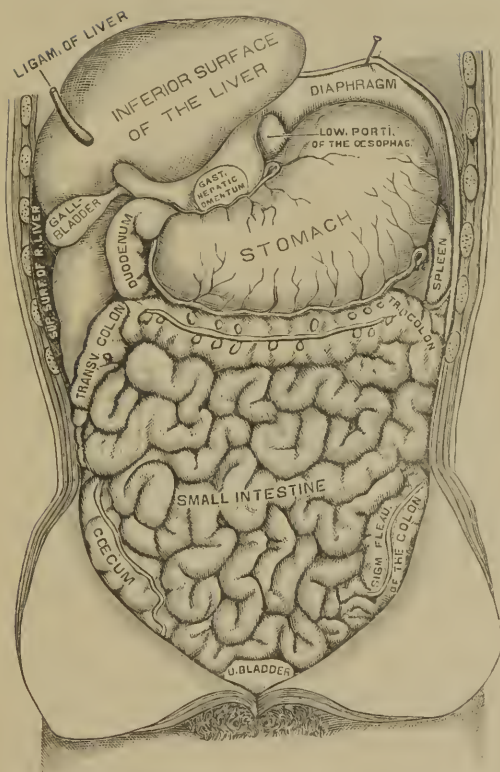


FIG. 2.—DIAGRAM SHOWING ABDOMINAL ORGANS

conditions. Where no actual disease exists, as in pregnancy, when the birth-track is too small, or there is some other abnormal condition preventing the occurrence of labor in the natural way, abdominal operation may be performed to effect the act of delivery.

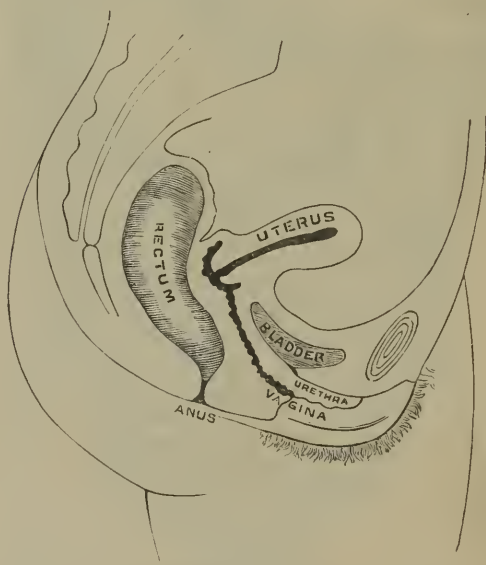


FIG. 3.—CUT SHOWING VERTICAL SECTION OF PELVIC ORGANS.

The special operation required in each case is known by a distinctive name. Since the nurse's work is closely associated with that of the surgeon, she will constantly

hear these terms used. It is desirable that she should understand their meaning, in order that she may make the necessary preparations in any given case intelligently. For the better understanding of these terms I append a list of the principal abdominal operations :

Operations on the Ovaries and Fallopian Tubes :

- I. Ovariectomy—removal of ovarian tumors.
- II. Oöphorectomy—removal of ovaries of comparatively small size, diseased or healthy.
- III. Removal of uterine appendages, or salpingo-oöphorectomy, when the tubes and ovaries are both removed.

Operations on the Uterus :

- I. Hysterorrhaphy, or fixation of the uterus to the abdominal wall to correct prolapse.
- II. Hysterectomy—removal of the uterus. Hysteromyomectomy—removal of a myomatous tumor from the uterus.
- III. Cæsarean section—an incision into the uterus during pregnancy, for extraction of the child.
- IV. Porro's operation—removal of the uterus, added to Cæsarean section.
- V. Operation for extra-uterine pregnancy—removal of tumor composing the ovum or egg, when it is found outside of the uterine cavity.
- VI. Abdominal section for rupture of the uterus.

Operations on the Stomach and Intestines :

- I. Gastrotomy—the making of an incision into the stomach for the removal of foreign bodies.

- II. Gastrostomy—the establishing of a tube-like passage into the stomach.
 - III. Gastrorrhaphy—the suturing of wounds in the stomach.
 - IV. Pylorotomy—removal of a part or the whole of the pylorus.
 - V. Gastroenterostomy—the formation of a passage between the stomach and duodenum.
 - VI. Duodenostomy—the operation of opening the duodenum and attaching it to the abdominal wall, to form an orifice for the introduction of food.
 - VII. Jejunostomy—the making of an artificial opening through the abdominal wall into the jejunum, for introduction of food.
 - VIII. Operation for intestinal obstruction.
 - IX. Enterotomy—the making of an opening into the intestine. Enterorrhaphy—suture of intestine.
 - X. Colotomy—the making of an incision into the colon.
 - XI. Resection of intestine—the removal of a portion of intestine.
 - XII. Operation for artificial anus.
- Operations on Kidneys :
- I. Nephrorrhaphy—the suturing of the kidney to the abdominal wall.
 - II. Nephrolithotomy—the operation for removal of stone in the kidney.
 - III. Puncture of the kidney.

IV. Nephrotomy—an operation for opening into the substance of the kidney.

V. Nephrectomy—removal of the kidney.

Operations on the Liver and Gall-bladder :

I. Hepatotomy—an operation for opening into the liver.

II. Cholecystotomy—an operation for opening into the gall-bladder.

III. Entercholecystotomy—an operation in which, after opening into the gall-bladder and intestines, the two wounds are sutured to each other.

IV. Cholecystectomy—removal of the gall-bladder.

Operations on the Spleen :

Splenectomy—removal of the spleen.

Operations on the Pancreas :

Operation for pancreatic cysts.

Operations for Tumors of the Omentum.

Operations for Tumors of the Mesentery.

Cystotomy, or abdominal lithotomy,—an operation for an incision through the abdominal wall into the bladder.

Although the operations mentioned are numerous, the general preparations for any case of abdominal section are so similar that they can be considered under one head. These will include the consideration of the following points :

I. Preparation of the room.

II. Preparation of sponges, instruments, and dressings.

- III. Preparation of the patient.
- IV. Preparation of the operator and assistants.
- V. A nurse's duty during operation.
- VI. A nurse's duty after operation and during convalescence.
- VII. The management of complications.

CHAPTER V.

THE PREPARATION OF THE ROOM.

In speaking of the importance of obtaining for the patient the best possible surroundings for such an operation, a celebrated English surgeon says: "There is no disputing the fact that the best results in abdominal surgery are obtained in specially prepared rooms or wards. . . . *An ideal room*, situated in an open and elevated locality, ventilated with warmed (and perhaps filtered) air, wall and floor impermeable to moisture and readily and easily washed, and with many other excellences which could be detailed, is rarely in this country at the disposal of surgeons." Hence grave operations are much more advantageously performed in hospitals where special operating-rooms are provided.

An operating-room should be equipped with all the modern aseptic appliances for facilitating surgical work, such as glass and metal tables, stands, closets, instrument-trays, flasks, etc.

In private houses, as a rule, the operation is done in the room which is to be occupied by the patient during the convalescence.

All the special preparations for aseptic work may be carefully arranged for, yet these can not secure the

results desired, should the operator, assistants, or nurses fail to observe the principles of surgical cleanliness in every detail. On the other hand, with a thorough understanding of these principles, operations of the gravest character may be performed with success in quarters the most unpromising, and in the slums and alleys of a crowded city. Since "necessity knows no law," the surgical nurse must be prepared to convert even the filthy apartment of a tenement-house into an aseptic operating-room. To this end certain instructions regarding the preparation of the room should be observed.

Dr. J. Grieg Smith tells us, "A well-kept bedroom in a home of gentle folks will require nothing changed or removed." Should the surgeon in charge of a case assume the responsibility of this arrangement, the nurse will, of course, observe his wishes in the matter. Should the preparation of the room be left to her discretion, she should regard everything in the room with suspicion until she has placed it beyond suspicion in the matter of cleanliness. The room should, if possible, be large and bright, facing the south, and one which can be kept well ventilated and yet comfortably warmed. There should be no stationary wash-stand in the room. If impossible to obtain a room without, the basin should have all its outlets plugged, and be kept filled with some antiseptic solution.

Carpets, curtains, upholstered furniture, everything that may harbor dust and filth, ought to be removed. If there is any possibility of the existence of infectious

or contagious germs in the room, it should be subjected to thorough disinfection with the fumes of sulphur or formaldehyde, or otherwise rendered surgically pure. Before the fumes are started, the metal fixtures in the room should be well greased with cosmoline, to prevent the injurious action of gases upon them.* After fumigation the room should be well ventilated. Should an open fireplace or a stove be in the room, keeping the windows open for twenty-four hours, while a large fire is kept burning in the grate, will freshen and purify it.

Regarding the use of the spray in purifying the atmosphere, we quote again from Dr. Smith: "Some surgeons seek to improve the purity of the atmosphere in which the operation is to be performed by making a steam antiseptic spray play in the room for a few hours. There is no strong objection to this; if it does nothing else, it lays the dust. But if the room has been properly cleaned and ventilated, and the surrounding air is of the moderate purity and freshness that may be found almost anywhere in England, the spray in the room is perhaps uncalled for. If any objection could be raised to the proceeding, I think it ought to be on the ground of saturating the atmosphere with moisture. Respiration is not so easy in an atmosphere laden with moisture as in one that is dry, and if a patient has to undergo a prolonged and dangerous operation, we should desire to

* This injurious action is noted more with the fumes of sulphur than with formaldehyde.

have the recovery from shock promoted by every possible surrounding benefit, one of which is certainly not a wet, depressing atmosphere to breathe."

Should a surgeon desire this procedure carried out, it may be done as follows: A shallow basin filled with the antiseptic solution required may be placed over a gas-stove, the steam from which will rise and fill the



FIG. 4.—STEAM ATOMIZER.

room. Doors and windows should be kept closed during the process of spraying, until the whole apartment has been thoroughly filled with the steam. A special apparatus known as a "steam atomizer" is sometimes employed, and is essential when during the operation it is desired to have the spray directed over the wound.

The nurse will need to keep the boiler filled about two-thirds full of water, to renew the antiseptic solution in the bottle from time to time, and to keep the alcohol-lamp in good working order.

The *walls* as well as the floor should be well swept, and all pictures removed. If painted, it is well to wash the walls with a three per cent. solution of boric acid. The floor should be washed up with bichloride of mercury solution 1:1000, after it has been well scrubbed. But little furniture should be permitted to remain in the room, but this, with the frames of windows, doors, etc., must be similarly washed off with an antiseptic solution. Shades must be taken down and dusted. Strips of linen may be placed on the floor to deaden the foot-falls.

The *furniture* should be conveniently arranged. The bed should be so placed that access may be had to it upon three sides, for convenience in lifting the patient, changing bedding, etc. Also, it should be so placed that the patient shall not face the light from the windows. It should be a single bed, preferably iron, and not too low, with a spring or woven-wire bottom, and a good horse-hair mattress. It is well, if possible, to have two beds, the patient being lifted from one bed to the other every night and morning, and the bedding thus kept aired. This is not a necessity, but a great comfort to the patient. A chair for the nurse and one for the doctor (not rockers), one or two stands, a wash-stand with china set, a bureau with a set of drawers, and one or

two large screens will constitute all that is necessary in the way of furniture. There should be a shade for the lamp, and a quiet-ticking clock placed where the nurse can see it without having to move too much about the room. Inside blinds are the best for tempering the light. There should, if possible, be a closet in the room, in which the various articles needed in the care of the patient may be kept. Changes of clothing, bedding, etc., may be kept in the bureau-drawers.

The *clothing* worn by the patient during the operation and subsequent convalescence should consist of woolen or merino vest, drawers, and socks, varying in thickness with the season; and a night-dress of special pattern, extending just below the shoulders in the back, so as to avoid unnecessary and uncomfortable creasing of the clothing as the patient lies upon her back, the front pieces extending down to about the knees. All the articles of dress should be a size larger or even two sizes larger than those ordinarily worn by the patient, as they are more comfortable to lie in when loose. A Nightingale wrap of light flannel is a convenience for the protection of the shoulders and arms.

The *preparation of the clothing*, sheets, pillow-cases, towels, napkins, etc., previous to operation is as follows: After coming from the laundry, where during the process of cleansing they should have been thoroughly boiled, all articles of clothing, bedding, etc., should be sterilized by heat (preferably by steam), and kept in a sterilized towel or sheet until needed. Blankets should

be new, and subjected to the same process of sterilization by heat.

Three sets of sterilized merino suits and night-dresses should be provided, to permit the necessary changing of clothing in case of accidents.

The *bed-clothing* is adjusted as follows: Over the mattress is placed a pad for its protection; across the middle of the bed a piece of rubber cloth a yard and a half wide is pinned down securely to the edges of the mattress. The under sheet or a blanket is then spread over the entire bed, also securely fastened at the corners and edges by safety-pins, to prevent creasing. A draw-sheet (a sheet folded in its length until it is about a yard and a half in width) is fastened across the middle of the bed; the closed fold of the sheet is directed upward toward the head of the bed to prevent the ridges, which more readily occur when the open end of the sheet is directed upward. The cover-sheet, blanket, and spread are then adjusted. Some prefer that the patient lie between blankets for a time; the cover-sheet in such case may be dispensed with.

As the patient may vomit when coming out of anæsthesia, it is well to protect the pillow by placing a piece of oil-cloth or rubber around it before drawing on the pillow-slip. A towel should be spread over the pillow before the patient is placed in bed, to protect the slip in like manner. If the pillow is not used, as it is often desirable to keep the head low, the towel may be spread over the upper end of the bed where the head will rest.

The *stands* should have clean cover-slips upon them. The feet of chairs, stands, or any movable furniture in the room should be muffled by a piece of roller-bandage or soft muslin, so that they may be moved noiselessly; or rubber mufflers may be obtained from dealers in rubber goods for the same purpose. Care should have been exercised beforehand to see that door-hinges, latches, and window-frames, etc., are in proper order, so that there may be no unnecessary rattling or creaking produced by them. It is so essential to keep the patient free from irritation that all these little points should be carefully considered.

A list of the principal articles needed in preparation for the operation is as follows :

1 strong kitchen-table for the patient's body, when a surgical operating-table can not be had.

1 small table of same height for patient's head.

1 quiet-ticking clock.

Rubber bags for hot water, metal foot-warmers, or soap-stone slabs or bricks for the application of dry heat—5 or 6 in all.

2 basins for catching fluid.

2 large basins for sponges.

2 or more flat trays, metal or hard rubber or glass, for instruments; basins may be used, though not so convenient.

2 basins for water for the doctor's hands, to be used interchangeably during operation.

2 waste buckets, large size.

2 buckets cold water.

1 bucket hot water, and arrangement made by which more can be obtained when wanted.

1 full wash-stand set.

1 tea-cup, graduated if possible.

3 dozen old soft towels.

1 operating pad.

1 irrigator, either a new Davidson hand-syringe, a fountain syringe, or a special contrivance consisting of a funnel, rubber tube, and long, hard-rubber nozzle. Preferably the water may be poured directly into the abdomen from a flask of Bohemian glass, as it is difficult to thoroughly cleanse hard-rubber nozzles.

1 thermometer for testing heat of water.

1 piece floor oil-cloth for protection of floor.

4 pieces rubber cloth, $1\frac{1}{2}$ yards square, one for the bed, three for the protection of patient during operation.

1 piece rubber cloth for protection of pillow.

2 pieces of new flannel, $\frac{3}{4}$ yard wide, $1\frac{1}{4}$ yards long, for abdominal bandage. The bandages should be prepared before operation.

2 pairs woolen hose.

3 sets merino flannels for patient's underwear.

3 night-dresses.

4 small horse-hair pillows, 8 x 10 in., to use around patient for relief of pressure.

3 new blankets.

$\frac{1}{2}$ dozen sheets.

- 1 spread.
- 1 or 2 mattresses.
- 2 pads.
- 2 large pillows.
- 2 or more straw pillows for knee supports.
- 1 pin-cushion with shield and common pins.
- 1 dozen safety-pins in alcohol.
- 1 set of antiseptic dressings.
- 1 lap absorbent cotton.
- 1 tray, with tumbler, feeder, teaspoon.
- 1 medicine glass.
- 1 clinical thermometer.
- 1 piece Castile soap.
- 1 new nail-brush.
- 1 vial bichloride of mercury tablets.
- 1 pound Calvert's No. 4 carbolic acid.
- 1 box of matches.
- 2 or 3 ruled reports.

Pencil and paper for taking directions for after-management.

Arrangement of Operating-table.—A table should be placed opposite a window, and but a few feet from it, unless in a special operating-room where the lighting of the apartment by means of a skylight may enable the table to occupy the centre of the space.

Various special forms of operating-tables have been devised and are in use in different hospitals. Ordinarily, however, a plain, narrow, wooden table, such as is used in kitchens in this country, may be made to serve the

purpose very well. A chair may be placed at the foot of the table, unless the table is longer than the patient. This will support her feet. If it is not high enough, a stool or cushions may be so adjusted as to raise the feet and prevent tension of the abdominal walls. A better

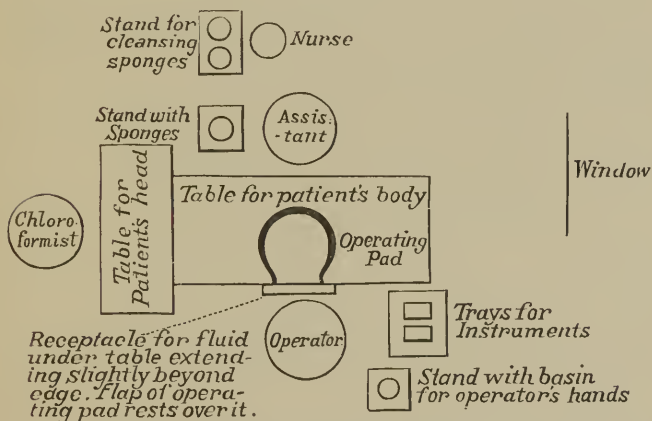


FIG. 5.—DIAGRAM SHOWING POSITION OF OPERATOR, ASSISTANT, ETC., WHEN BUT ONE ASSISTANT.

arrangement is the use of a small table, placed as in the cut, for the head.

The *table* should be covered with a thick, folded blanket or comfortable. A large piece of rubber cloth or table oil-cloth may be fastened across the middle, or, better still, over the entire table, being fastened to its edges by tacks to prevent slipping. A sheet is similarly

fastened over this. A pillow protected by rubber is placed at the head of the table, and a folded blanket and sheet for covering the patient should be placed at the

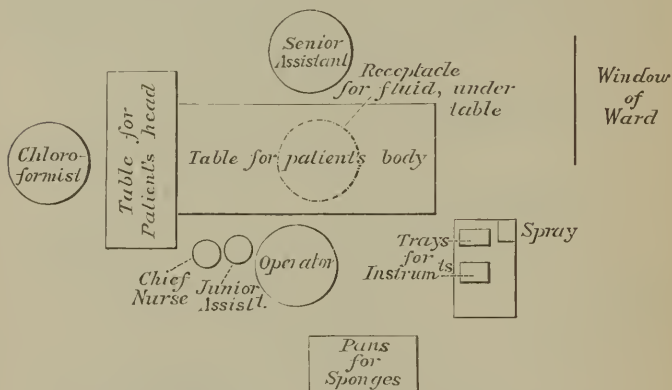


FIG. 6.—DIAGRAM SHOWING POSITION OF OPERATOR, ASSISTANTS, ETC., WHEN TWO ASSISTANTS.*

foot. The *operating-pad* should be placed, for an abdominal operation, in such a position that it would lie beneath the site of the abdomen—about the middle of

* The Trendelenburg position employed by many surgeons in this day, when performing abdominal operations for pelvic disease, requires that the head of the patient should be lowered and the pelvis elevated. Special tables are devised for this purpose, although in their absence the ordinary operating table may be used by raising it at one end and placing boxes under the feet thus raised. The head of the patient in this case must be directed toward the window supplying the light, and the feet away from it, reversing the position as described in the diagram.

the table. When a Kelly pad can not be had, the nurse may improvise a pad by twisting a sheet in its length, pinning it to the covering of the operating-table in the shape of the Kelly pad, the twisted sheet representing the raised edges of the pad. A piece of rubber can then be used to cover this arrangement, being tucked in along the outer side of the twisted sheet and draping over the edge of the table, so as to represent the apron of the pad. The hanging end of the rubber should rest over a waste-bucket.

If the carpet has not been removed from the room, some protection must be used under the table, as a piece of floor oil-cloth, large enough to extend some distance around the table, or a piece of drugget or old carpet may be used, provided they are clean.

In a case of ovariectomy, or any operation where great quantities of fluid will probably need to be drawn off, a large foot-tub should be placed beneath the table for the reception of the fluid, also two basins, to be used interchangeably in receiving the fluid as it flows from the canula, and emptying it into the tub.

Since the operator stands on the right side of the patient, the *stand for his instruments* should be placed near the foot of the table on the right side. Just back of the operator and a little to the right should be another stand or chair, upon which a basin of water for his hands should be placed, to be used during the operation. The water in this basin should be frequently changed by the nurse; a slop-jar for the soiled water,

and a pitcher from which the basin may be replenished, may stand beside this table.

The *assistant* stands opposite the operator, on the left side of the patient; therefore to his right and toward the head of the table should be placed a small stand for holding a *basin for the sponges*, which, if natural sponges, should, after being cleansed, be thrown into the warm sterilized water. The *nurse's stand* with two large basins filled, the one with cold and the other with warm sterilized water, should be placed a short distance back of this, so that the assistant may readily throw a soiled sponge into the basin containing cold water. The nurse in charge of the sponges will then thoroughly wash out the blood, rinse the sponge through the warm water, and place it in the basin to the assistant's right. A slop-basin and a pitcher or flask of warm and one of cold sterilized water should stand by the nurse's table, so that there may be no delay in changing the water. Natural sponges are little used now for work in abdominal surgery, antiseptic gauze pads being greatly preferred. Many surgeons use them dry rather than moistened. No gauze sponge is used a second time.

A basin of water for the cleansing of her own hands should stand conveniently near, either on the stand or chair, so that, in attending to the emptying and refilling of the basin, she may cleanse her own hands before again touching the sponges.

A small, light basin should be placed under the pillow on the table, to be at hand should the patient vomit.

Three or four soft towels to be used by the etherizer may also be placed under the pillow. The irrigator, with a pitcher or two or flasks of sterilized water of required temperature, should be placed to one side, in readiness for irrigation of the abdominal cavity.

The *window* may be screened by a thin curtain of white muslin or lace fastened across the lower panes, or, if necessary to protect the entire window from the intrusive gaze of outsiders, whiting may be painted over the inside of the panes, which will exclude observation, but admit light.

When the operator works with two assistants besides the anæsthetizer, the arrangement as indicated in figure 6 may be followed.

Immediately before the operation, *heated foot-warmers*—bricks wrapped with towels or jars filled with hot water—should be placed in the bed, over the site upon which the patient is to lie, and under the covers, so that the bed may be warm for her reception.

A basin containing a block of *ice* and one or two soft towels may stand near the etherizer, as the application of cold to the head during etherization aids frequently in controlling nausea and diminishing the subsequent headache.

The *restoratives* which may be needed should the patient sink into collapse should be near at hand—brandy, digitalis, aromatic spirit of ammonia, oxygen gas, etc., as the surgeon may desire. A hypodermic

syringe in good condition for immediate use should also be provided.

The *irrigator*, syringe, or flasks to be used in washing out the abdominal cavity with sterilized water or normal salt solution should be kept in readiness for use when called for. Special flasks for hot and cold sterilized

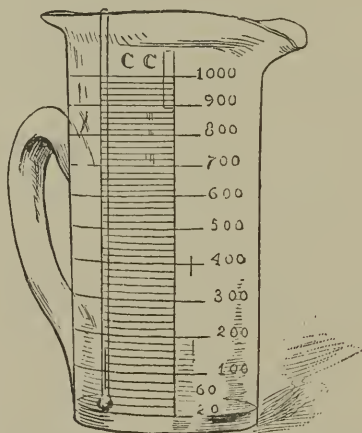


FIG. 7.—GLASS GRADUATE WITH THERMOMETER.

water may be provided, or a large pitcherful of each, covered with towels to prevent contamination with dust, may be set to one side for the purpose. A large supply of water at the required temperature (from 105° to 110° F.) should be kept in constant readiness, so that no time may be lost in preparing it.

A *bath thermometer*, kept in the pitcher, enables the nurse to watch the temperature of the water, and to make an addition to it from time to time from the pitcher of hot water, so as to have it just right when wanted. A large glass graduate with thermometer attachment is used for irrigating in some hospitals.



FIG. 8.—IRRIGATION FLASK.

A good plan, where considerable water is likely to be needed for irrigation, is to have three or four flasks of water of the required temperature ready, so that they can be used in quick succession.

CHAPTER VI.

PREPARATION OF SPONGES.

The use of the natural sponge has been almost entirely superseded by the use of small *pads of absorbent gauze*. These are made of three sizes and are thoroughly sterilized prior to their use.

Roosevelt Pattern.—The gauze sponges are best prepared as follows: An oblong piece of gauze is taken and its edge on one side turned over for about two inches. The two adjoining sides are then folded over this surface and the square completed by slipping the edge of the remaining side into the fold opposite it, as the flap of an envelope may be slipped into the envelope. No stitching is required.

Small pads can be used rolled and mounted in sponge-holders for introduction through a small wound or the wiping out of deep cavities.

Larger pads having a soft piece of knitting cotton eighteen inches long knotted into one corner, called "string sponges," are used for packing into the abdominal cavity for the protection of the intestines.

These gauze pads are regarded as safer than the

natural sponge, as they can be rendered thoroughly sterile with greater readiness. They are not, however, quite so absorbent as the natural sponge; hence some surgeons continue to use the latter even in abdominal work.

There are various species of sponges, some being much finer and softer than others. These come to us largely from Turkey, and are called Levant sponges. The latter are especially well adapted for use in surgical work. Sponges having on them orange-yellow spots are diseased and should not be used. The light-colored sponges seen in drug-stores have been bleached by the use of chemicals, but will always require re-cleansing before use.

The fact that they have been thus subjected to chemicals prior to their purchase often renders them very tender, so that the cleansing processes employed by the nurse may cause them to become ragged and unfit for use. Care must therefore be taken not to subject them too long to the action of the acids used in purification. Sponges being sold by weight, sand is often used as an adulteration.

For hospital use sponges may be bought in twenty-five-pound bales, bleached and purified. When thus obtained and prepared, they probably cost about $\frac{3}{4}$ of a cent each when ready for use. For private operations the surgeon usually provides his own sponges and attends to their preparation. Fine sponges for surgical use can be obtained in strings of about fifty.

The methods for cleansing natural sponges, as obtained by the bale, is as follows :

FOR CLEANSING NEW SPONGES.

Method No. 1.—They must first be pounded in an iron mortar, or upon a flat stone, to break up any particles of sand they may hold. Should they be very sandy, it is well to soak them in a solution of muriatic acid (two drachms to the pint) for a few hours. Wring them out in several clean, filtered waters until the water remains perfectly clear. Then immerse in a saturated solution of permanganate of potassium for an hour. After bleaching them with a ten per cent. solution of sulphurous acid (which does its work in an instant), again wring them out in several clean, filtered, and sterilized waters until the water remains perfectly clear and transparent.

Method No. 2.—After ridding the sponges of their sand according to the method described, wring them out of several clean waters. Then immerse in a saturated solution of permanganate of potassium for an hour. Next put them into a saturated solution of oxalic acid and let them remain in this until bleached. They must then be rinsed in several waters (the water being filtered and boiled) until the water is perfectly clear.

TO CLEANSE OLD SPONGES.

After washing them in cold water to remove the blood, let them soak from ten to twelve hours in a satu-

rated solution of baking-soda, to free them completely of animal matter. Rinse in several waters, and immerse for an hour in the saturated solution of permanganate of potassium. After bleaching them with a saturated solution of oxalic acid, rinse them in several clean waters (boiled and filtered) until the water is clear.

Of the methods described, the first produces the prettiest sponges, as the bleaching process is more complete with the sulphurous than with the oxalic acid. Should the sponges during an operation get into a bichloride of mercury solution, it will be found that in recleansing them the sulphurous acid can not be used, a chemical reaction causing a darkening of the sponge, so that, although clean, it looks unfit for use.

After cleansing, sponges may be *stored* until needed in tightly covered glass jars, being immersed either in alcohol or in a solution of carbolic acid 1 : 40.

Before operation, the sponges thus stored should be thoroughly rinsed out in sterilized water and placed in a basin containing warm sterilized water until wanted.

The *number* of sponges to be used during operation should be carefully counted and recorded on a piece of paper, placed in some conspicuous place for the operator to see. An addition should never be made to the number of sponges in use during an operation without a corresponding change in the number marked on the paper. A sponge should never be cut in two without a similar precaution, as this will change the count, and a

sponge may thus be lost sight of and allowed to remain in the abdomen.

When the operator is ready to close the abdomen, all the sponges should be counted by the nurse, so that the operator may be assured that all are accounted for.

The assistant, as a rule, takes the natural sponges out of the warm water and squeezes them dry as he desires them. Should this office devolve upon the nurse, she should see that they are well freed from moisture, and that they are warm when handed to the surgeon.

Sponges which are to be carried into the abdomen for cleansing it should be mounted on rods called sponge-holders. Three or four of these should be in readiness. They will be needed at the close of the operation, and must be handed in rapid succession as wanted. When thus placed in holders or forceps, they are called *mounted sponges*.

Flat sponges are used for protecting the intestines, or for application of heat to the abdominal wall. It is well to keep these flat sponges in a separate basin of hot water, handing them when needed. Large squares of flannel wrung out of hot water are sometimes used in place of sponges for application of heat to the abdomen, or for covering over coils of intestine or omentum that may be drawn out of the wound during the course of an operation.

CHAPTER VII.

STERILIZATION OF INSTRUMENTS, ETC.

The nurse receives the instruments from the surgeon and subjects them to a process of sterilization by wrapping them in a clean, dry towel and laying them in a dry or a steam sterilizer, according to the operator's wish.

If dry sterilization is used, the temperature will require to be at least as high as 110° C., or 230° F.

In the steam sterilizer a temperature of 100° to 105° C., corresponding to 212° to 221° F., is sufficient. The rule in most hospitals is to keep the instruments in the sterilizer for about a half-hour immediately preceding operation. At the time of the operation the instruments may be lifted out, and, the towel around them being loosened, they may be allowed to slip into sterilized trays containing warm sterilized water. The nurse's or assistant's hands should be thoroughly disinfected before this is done. Some forms of steam sterilizers contain a wire tray in which the instruments may lie immersed in a one per cent. solution of carbonate of soda during the process of sterilization. This prevents the rusting and discolorization of the instruments so often observed after the ordinary process.

The method of sterilizing the *dishes or trays* which

are to contain the instruments is as follows: They should first receive a thorough cleansing with soap and warm water, and then should be filled with some strong antiseptic solution, as 1 : 500 or 1 : 1000 bichloride of mercury—if of rubber or porcelain; if metal, a solution of carbolic acid 1 : 20 should be used. This may stand

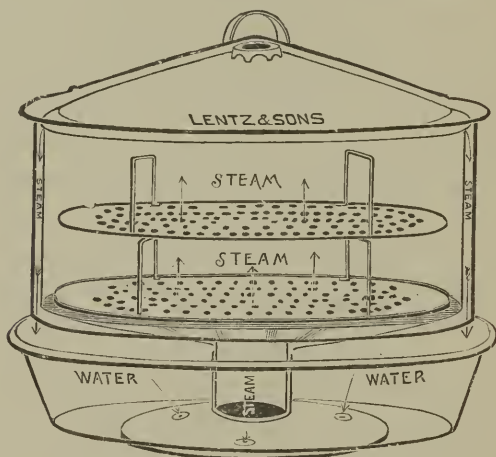


FIG. 9.—ARNOLD STEAM STERILIZER.

in the trays until they are needed for the instrument, when the antiseptic solution, being emptied out, is replaced by boiled distilled or filtered water. The trays should be about half full, so that the instruments may be well covered.

When a steam sterilizer is large enough, trays,

basins, flasks, etc., can be placed in it for sterilization, after thorough cleansing.

All the *towels and sheets* in use around the patient should be sterilized. Having been carefully laundered, they should be placed in the steam sterilizer wrapped in towels for three successive days preceding the operation, one hour the first day and a half-hour each subsequent day.

When steam sterilization or dry sterilization can not be effected for want of means, the towels, etc., after a thorough boiling, may be soaked in a solution of bichloride of mercury 1 : 1000, or carbolic acid 1 : 20, and carefully dried in an oven or clean drying-chamber. After this they should be kept free from dust in large glass receptacles or closed boxes, or they may be stored in a carbolic acid solution. The steam sterilization is much more secure.

The sterilization of *cheese-cloth or gauze*, and the preparation of bichloride gauze, etc., has already been given in detail in the chapter on Asepsis and Antisepsis.

In *cutting gauze* into strips or squares in the preparation of dressings, care should be taken not to contaminate it. A sterilized towel may be spread over a piece of rubber cloth which has previously been cleaned with some antiseptic solution ; the gauze may be laid down upon it and cut into the desired sizes with a pair of sterilized scissors. The hands of the nurse should be thoroughly disinfected prior to the operation of cutting the gauze. Strips of gauze 6 to 8 inches long and 4

inches wide are of good size for dressing wounds, also gauze pads 4 inches square, some of which are folded so as to make triangles. These are especially nice for tucking around a drainage-tube or *serre-nœud*. For cleansing a glass drainage-tube, long, narrow strips of gauze, cut bias (1 yard long and 1 inch wide), are useful, while strips 2 to 3 inches wide and 3 or more yards in length are necessary for gauze packing of a cavity, as in the Mikulicz drain.

The strips of gauze used for cleaning a drainage-tube should be placed in sterile test-tubes plugged with non-absorbent cotton, sterilized in steam sterilizer, and kept on hand for use. To prevent handling the dressings, the nurse can then simply remove the cotton plug and hold the tube near the surgeon, enabling him to help himself to the pieces as he needs them. A large pad of several folds of gauze, or a pad of sterilized absorbent cotton inclosed in gauze, and large enough to cover the whole abdomen, should be in readiness.

A sterilized, many-tailed *bandage* of new flannel, and *safety-pins* in a vessel containing alcohol, will be necessary.

The bandage, with the pad and strips of gauze and a piece of rubber dam about 16 inches square (also sterilized by soaking in carbolic or bichloride solution), with sterilized gauze to be placed over the drainage-tube, should be wrapped in a sterilized towel and placed to one side until needed, when the nurse should bring them to the operator. If a drying powder, such as boric

acid or iodoform, or the two combined, is used, it is best kept in a pepper-box or a glass powder-shaker, so that the powder may be dusted on to the wound.

The bandage should consist of a piece of new opera flannel (canton flannel or even thick muslin may be used). This should be properly shrunk. A piece sufficient for one bandage should be about $\frac{3}{4}$ of a yard wide and $1\frac{1}{4}$ to $1\frac{1}{2}$ yards long. The sides should be torn toward the centre into five strips of equal width. A square of unbleached or any firm muslin, large enough to extend well beyond each side of the patient's loins as she lies upon the bed, may be used as the base on which the middle portion of each one of five separate strips of flannel may be sewed. The strips should be closely basted on, each overlapping the preceding strip about $\frac{1}{3}$ of its width. The muslin may be turned over the edges of the highest and lowest strip. The square of muslin and the strips should be whipped with cotton at the edges, and not hemmed, as this makes an uneven surface to lie on. The bandage should be made longer or shorter according to the size of the patient. The object of the muslin square is to prevent the disagreeable sensation of flannel next the skin, particularly as in lying upon it the back is apt to become much heated.

In putting this bandage on, it should be so arranged that each succeeding strip overlaps the one already adjusted, starting from the upper part of the abdomen. Some surgeons use a perineal pad in addition to the abdominal dressing. In that case a pad of sterilized

gauze or cotton may be applied over the vulva and held in place by means of a napkin or towel fastened to the lower border of the abdominal bandage, both anteriorly and posteriorly, or a strip of muslin may be stitched to the lower border of the bandage, making a T-bandage.

A word or two further may be said in this connection concerning the india-rubber cloth used for protection of the drainage-tube. A piece about one foot and a half square is necessary. A very small hole is cut in the centre of the cloth. The edge of the hole in the cloth is slipped over the rim of the tube and grips the neck of the tube. If properly put on, this rubber cloth will catch any fluid which may escape through the gauze dressings or cotton covering the orifice of the tube. At each dressing the nurse has simply to turn down the covers of this cloth, which had been folded over the tube and pinned. The tube is thus made accessible.

In hospital practice particularly it frequently devolves upon the nurse to prepare, or assist in preparing, the ligatures and sutures.

Ligatures are strands of silk or catgut, etc., used in tying bleeding vessels, or separating tumors, diseased organs, etc., from the tissues to which they are adherent.

Sutures are strands of various materials—silver wire, iron wire, silk, silk-worm gut, catgut, etc.—used in approximating the edges of wounds.

The *silk* used in abdominal surgery is generally the best quality of "Surgeon's Cable Twist." Three sizes are usually required: fine for the superficial sutures,

medium or intermediate for the deep sutures, and heavy for pedicles. This is the best silk for minor operations as well.

Linen sutures coated with celloidin make an economical and valuable addition to the surgeon's resources.

Catgut comes in similar sizes, and is required in the three kinds for the same purpose, if the surgeon prefers its use to silk.

These should be wound on separate glass reels for sterilization before use.

Sterilization of Silk.—The reels containing silk should be put into glass tubes, like test-tubes, containing a wad of non-absorbent cotton in the bottom. The mouth of the tube should be plugged with cotton. The tubes may then be placed in a steam sterilizer or sterilizing oven for a time on three successive days—for one hour the first day, and half an hour on the second and third days. It is said that, thus sterilized, it will keep indefinitely.

Another very satisfactory formula for sterilizing silk is the following:

1. Wind silk on sterile reels.
2. Boil in a $2\frac{1}{2}$ per cent. carbolic solution as follows:

No. 4, heavy silk, for from 20–30 min.

No. 3, medium, for from 15–20 min.

No. 1, fine, for 5 min.

3. Keep in absolute alcohol.
4. Boil in sterile water immediately before operation.

Linen Sutures.—The following formula for making and sterilizing linen celloidin sutures is given by Gu-baroff:

1. Boil the linen thread in a 1 per cent. solution of soda for eight minutes, to remove the fat.
2. Wash in cold water. Do this twice at an interval of six hours.
3. Dry in a clean room and wind on sterile glass reels.
4. Keep for twenty-four hours in a 25 to 30 per cent. solution of celloidin (Schering's) in equal parts of alcohol and ether, to which is added 1 per cent. of sterilized castor oil.
5. Wind on a wooden frame, that it may dry, removing the excess of celloidin with the finger or clean paper.
6. Keep in a closed glass vessel, and before use boil for from six to eight hours, just before the operation, in 1 : 1000 bichloride of mercury solution.

Sterilization of Catgut.—Formula I.—Soak the catgut in bichloride of mercury solution 1 : 1000 for one hour, then in absolute alcohol one hour. Following this, soak for forty-eight hours in oil of juniper and wind on glass reels.* For half an hour before use the reels of catgut may be placed in a jar containing alcohol and boiled in a water-bath.

Formula II.—Formalin catgut:

1. Soak coils of catgut for twenty-four hours in a 2 per cent. aqueous solution of formalin (commercial formalin, ℥xij; aq. dest., q. s. ad f℥x).

* Many surgeons omit the use of oil of juniper in this process.

2. Wash the catgut thoroughly in sterilized Tavel's solution.
3. Preserve in sterilized Tavel's solution in sterilized glass jars.

Tavel's solution consists of the following :

Sodium chlorat.,	gr. xxij
Sodium carbonat.,	gr. vij
Aq. dest.,	q. s. ad f 3vj-f 3ij.

This preparation of catgut will keep well for six days. A fresh quantity must then be made up. It is very soft and pliable.

Formula III :

1. Soak catgut for from two to three hours in washed ether.
2. Wash glass reels thoroughly in soap and water, boil one-half of an hour and soak three hours in carbolic solution (5 per cent.), then in washed ether for half an hour.
3. Wind the catgut on the sterile reels, which have been shaken thoroughly dry.
4. Put in jars with fresh ether for forty-eight hours.
5. Take reels out of ether, put into and preserve in bichloride ether, 1 : 1000. This is ready for use in thirty-six hours, and will keep, it is said, for twelve months.

Formula IV :

1. Soak coils of catgut in absolute ether for twenty-four hours.
2. Pour off ether, cover with a solution of alcohol,

2000 parts; distilled water, 400 parts; mercuric bichloride, 20 parts.

3. Renew this solution three times at intervals of twenty-four hours.
4. Pour off solution, wind gut on sterile reels, and soak in absolute alcohol for twenty-four hours.
5. Put into fresh alcohol until needed for use.

Formula V.—Palladium bichloride catgut:

1. Steep gut in ether twenty-four to forty-eight hours.
2. Transfer immediately into following solution:

Merc. bichlor., gr. xl
 Ac. tartar., gr. cc
 Alcohol (95 per cent.), f $\frac{3}{4}$ xij.

Keep the finest gut in for 7 min.

“ “ next “ “ “ 10–15 min.

“ “ medium “ “ “ 20 min.

“ “ coarse “ “ “ 25 min.

3. Put into sterilized jars which have been soaked in bichlor. 1:1000 and filled with alcohol (95 per cent.) and palladium bichloride gr. $\frac{1}{16}$ to Oj; or make a strong solution of grs. xv mercuric bichloride to the fluidounce of alcohol, and use two minims of this to one pint of alcohol for storing.

Formula VI.—Chromicized catgut:

1. Cleanse gut in ether once or twice.
2. Soak in the following solution for from forty-eight hours to one week, according to size of gut:

Potass. bichrom., gr. xxx
 Carbolic solution (5 per cent.), f $\frac{3}{4}$ xxxij.

3. Wind on sterilized reels and store in bichloride ether 1 : 1000 or bichloride alcohol 1 : 1000.

Formula VII.—Mikulicz's strong chromic gut:

1. Place gut for forty-eight hours in carbolic acid, 10 parts ; glycerine, 90 parts.
2. In solution of chromic acid 1 : 200 for five hours.
3. Preserve in absolute alcohol.

Formula VIII.—Kronig's cumol. catgut :

1. Cut the catgut into desired lengths. Twist several strands into figures-of-eight and slip them into test-tubes.
2. Put the test-tubes into a hot-air oven, and bring the temperature up to 80° F. Keep the temperature at this point for an hour.
3. Place the catgut in cumol. Surround the tube with a sand-bath, and raise the temperature to 165° F. Keep up this heat for an hour.
4. Pour off the cumol, and allow the catgut to dry by the heat of the sand-bath ; or place it in a hot-air oven at a temperature of 100° F. until all the cumol is driven off.
5. The catgut may then be placed in sterilized tubes, which should be plugged with sterile cotton.

Kronig's method is now employed in the Johns Hopkins Hospital at Baltimore. The method requires considerable time and much care, but gives excellent results.

Silk-worm gut is prepared as follows :

Cut off the stringy ends, boil in 2½ per cent. car-

bolic solution for fifteen minutes, and put into sterilized test-tubes filled with alcohol and tightly corked.

Colored silk-worm gut is (1) soaked for twenty-four hours in a 1 per cent. solution of methyl-violet; (2) boiled for fifteen minutes in distilled water; (3) preserved in alcohol in sterilized, tightly corked test-tubes.

Ligatures should be cut both of silk and catgut bunched and wound together, and placed in tubes for sterilization. Care must be taken to observe the different methods in sterilization of silk and catgut.



FIG. 10.—IGNITION TUBE CONTAINING GLASS REELS WOUND WITH SILK, ETC.

Tubes should be prepared containing only one size of ligatures. When sutures or ligatures are wanted from a tube, the quantity needed may be removed and the tube replugged. The length of ligatures will vary with the requirements. Short ligatures of fine silk or catgut, six to eight inches in length, are used for tying superficial vessels. A medium thickness will be needed for deeper and larger vessels, and the thickest strands for ligating the pedicles of tumors, etc. The latter ligatures will need to be from forty to fifty inches long, as the

pedicle must frequently be divided and the ligatures used to inclose considerable tissue.

The glass tubes used for this purpose are called *ignition tubes*, and have the advantage over ordinary test-tubes in their greater durability.

Should **capillary drainage** be employed, the nurse will need to prepare pieces of gauze cut into narrow strips in suitable lengths for drainage-tubes. These should be sterilized in ignition tubes, similarly plugged, and used as required in the changing of the dressing.

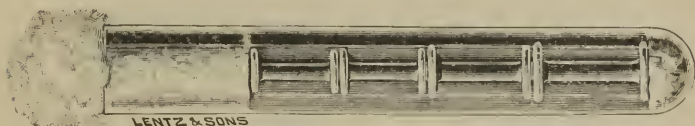


FIG. II.—IGNITION TUBES FOR STERILIZING LIGATURES, ETC., CONTAINING GLASS REELS.

A sufficient supply of sterilized dressings, gauze, cotton, etc., and another bandage should be kept in readiness for changes subsequent to the operation. These should be carefully guarded from all contamination; hence should be wrapped in a sterilized towel, and kept in a closed box or drawer, or in closed glass jars.

The **threading of needles** for the operation sometimes devolves upon the nurse. In that case a tray with the needles already threaded and the ligatures and reels of sutures properly arranged should be in readiness for the

surgeon. Long, straight glovers' needles are those ordinarily used by many surgeons for the deep stitches; others prefer curved needles, which should be of large size where the abdominal walls are thick. If the surgeon desires, these should be threaded at both ends. Four or five sets of these sutures at least should be prepared, as there is often considerable delay in rethreading. For the superficial stitches a smaller glovers' needle or small, curved needle with fine suture will be required. The large needles are frequently used without

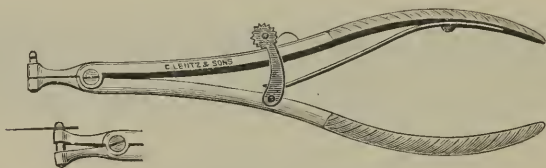


FIG. 12.—NEEDLE-HOLDER.

being placed in a needle-holder. The smaller ones the nurse should place in the holder before she hands them to the physician. In seizing the needle in the holder care should be taken not to grasp it directly over the eye, but just beyond it, as the eye is apt to split from the pressure.

The silk and catgut may be carried through the eye, and occasionally silk-worm gut and wire are also thus threaded. In the latter case the strand should be carried but a short distance through the eye and bent

into a sharp angle at the point where it passes through, so that it may not catch on the tissues. Silk-worm gut and wire are often drawn through the tissues by the aid of strands or loops of fine silk, called *carriers*, into which the angle, made in the bent silk-worm gut or wire, may be hooked. The loop is made by passing the ends of the silk through the eye on the same side of the needle, crossing them and tying around the needle in a small knot.

Ligatures for the pedicle are threaded into an instrument with an eye at the point, called a *pedicle needle*.

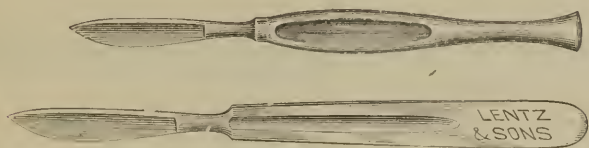


FIG. 13.—SCALPELS.

The operator usually has two or three of these. The long ends of the silk should be twisted around the instrument to prevent tangling, until the ligature is needed.

A list of the instruments most commonly employed for abdominal operations is as follows:

Scalpel.

Bistoury (see Fig. 68).

Hæmostatic, or pressure forceps.

Grooved director.

Scissors (curved, straight, or angular).

Trocar and canula.



FIG. 14.—PRESSURE FORCEPS.

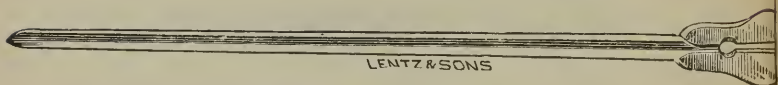


FIG. 15.—GROOVED DIRECTOR.

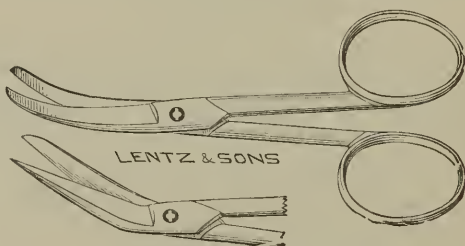


FIG. 16.—CURVED AND BENT SCISSORS.

Volsella.

Cyst forceps, or large pressure forceps, straight.

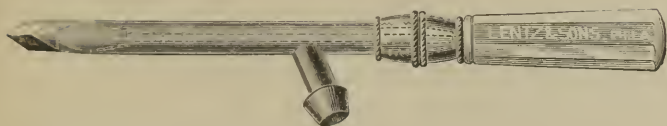


FIG. 17.—TROCAR AND CANULA.

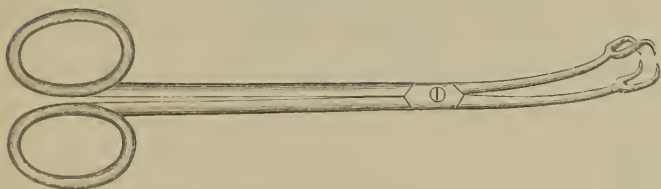


FIG. 18.—VOLSELLA.

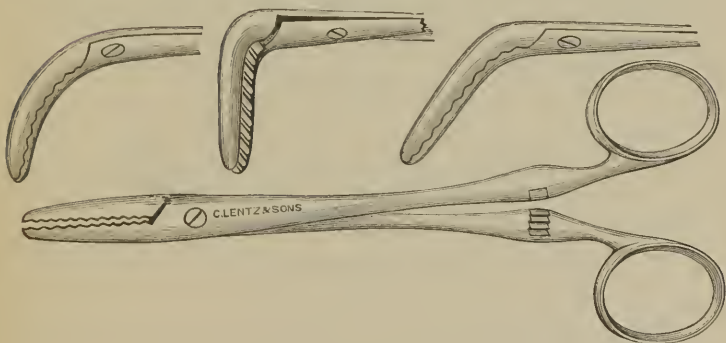


FIG. 19.—CYST FORCEPS.

Bent pressure forceps.

T " "

Retractors, which come of varying sizes.

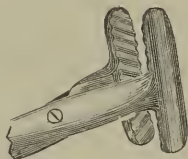


FIG. 20.—T-FORCEPS.

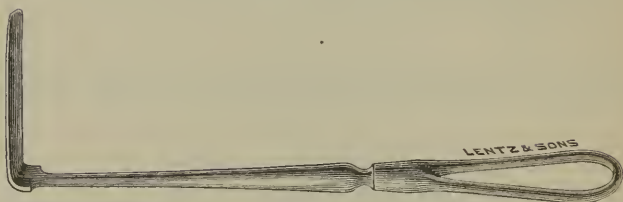


FIG. 21.—RETRACTOR.

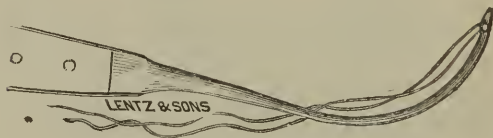


FIG. 22.—PEDICLE NEEDLE.

Pedicle needle.

Needle-holder (see Fig. 12).

Serre-nœud.

Pedicle pins.

Drainage-tubes—glass and rubber.

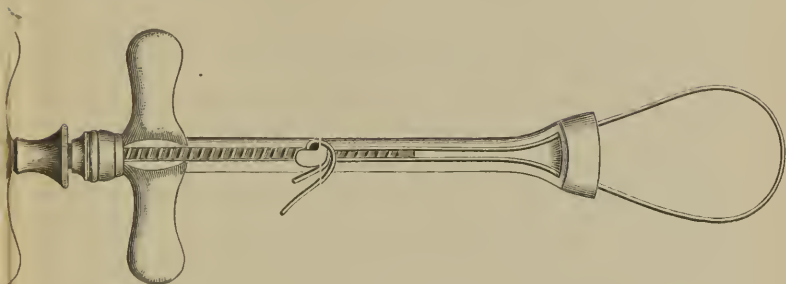


FIG. 23.—SERRE-NEUD.

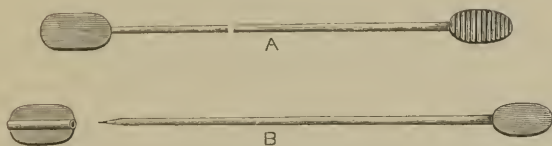


FIG. 24.—PEDICLE PINS.

Syringe for draining tube.

Needles.

Murphy button.

CHAPTER VIII.

PREPARATION OF THE PATIENT.

It is well, if possible, to have the patient under observation some days before operation, in order that she may have a thorough physical examination, and also that the functions of skin, kidneys, and bowels may be stimulated to their proper activity, if they have, as is so often the case, been sluggish from improper habits of living.

If the patient is in fair condition, a daily warm *bath*, with a thorough cleansing of the skin with soap and water, will be of advantage. A steam or Turkish bath, if the patient is able to take it, is especially good for cleaning the skin of impurities. On the day of the operation particular care will have to be taken in the cleansing of the site of the operation. This process will be described later.

A daily *vaginal injection* of some antiseptic solution is desirable, preferably of bichloride of mercury 1 : 8000.

A daily *evacuation of the bowels* should be obtained by careful regulation of the diet, or, if necessary, by the use of laxatives and enemata as prescribed by the surgeon.

The *meals* should be of such character as to leave as little residual matter in the bowels as possible. Hence

broths, milk, eggs, etc., should constitute a large proportion of the dietary. The patient should be well fed, but a careful selection of the articles for her meals should be made. Many operators avoid milk, fruits, and vegetables, and keep the patient, during the preparatory period, entirely on a bread and meat diet.

The day before the operation it is well to employ a *purge*; one of the salines is usually employed for the purpose, as a tablespoonful of Rochelle or Epsom salts by mouth; or the surgeon may prefer the use of a saline by enema.

A combination frequently used is the following:

2	tablespoonfuls	of Rochelle or Epsom salts.
2	"	" Castor oil.
1	"	" Turpentine.
1	"	" Glycerine.
1	quart	of water (105° F.).

These should be thoroughly mixed and carefully injected into the bowel. As a rule, the bowels act freely within a short time after this injection has been received. To prevent any possible irritation of the bowel a small quantity, as one gill of saline solution ($\frac{1}{2}$ of a teaspoonful of salt to one gill water), may be injected into the bowel and retained after a free evacuation has been obtained. Should the salts be given by mouth the evening before an operation, a simple enema of soapsuds on the following morning will be sufficient to produce a satisfactory evacuation.

On the *morning of the operation* a full bath should be given—a plunge bath of soap and warm water, if the patient is strong enough. If not, a sponge-bath may be given as the patient lies in bed.

The abdomen should be shaved of all hair, particularly the pubes. It is well to ask the surgeon whether he desires this done or not, as some surgeons prefer doing it after etherization, if done at all.

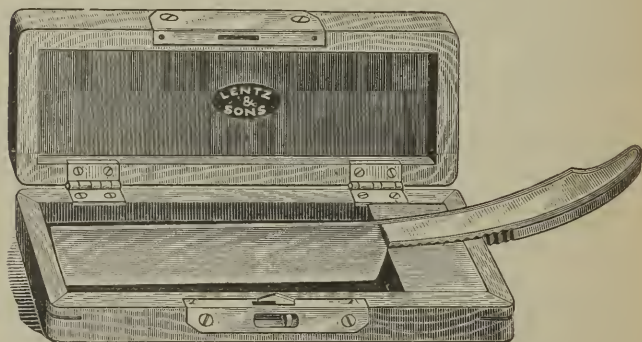


FIG. 25.—ASEPTIC RAZOR WITH METAL HANDLE.

Cleanse the abdomen of all grease by rubbing over it a little turpentine, alcohol, or ether. This should be followed by again washing with warm water and subsequently with the antiseptic solution 1 : 1000 bichloride of mercury. After this a dressing, wet or dry, of some antiseptic gauze should be bandaged over the part and kept in place until it is time for the operation. In this

cleansing the umbilicus and pubes should be especially well scrubbed with a nail-brush; all particles of dust and dirt should be gotten rid of.

The patient's *hair* should be arranged in two braids, one immediately behind each ear, the hair being parted all the way down the back. This gives the patient a smooth surface to lie on, and prevents the matting of the hair, which is so apt to occur in any long-continued illness.

Earrings should be removed, as they may catch in the clothing, and, if the patient struggles while taking ether, the ear may be torn. *False teeth* should be removed, whether whole sets or single teeth, as they may be swallowed during etherization. They should be put away in a safe place. It is best to keep them immersed in a little fresh water.

The patient should have on an entirely fresh suit of *clothing*: a merino undervest opened all the way down the front and brought together by tapes fastened two or three inches back from the edges, so that no gap may be left between when the tapes are tied. Merino drawers and woolen stockings should be worn, and a night-gown of especial pattern, having a short back-piece which reaches just below the shoulders, the front of the gown being long enough to reach to the knees. This avoids the thick folds and creases under the patient's back which the ordinary long night-gown is so apt to produce.

The patient should void urine before operation, so

that the full bladder shall not be in the way of the operator. If there is some abnormal condition which prevents her passing water, the catheter may have to be passed. But this is best done after etherization, both because it gives the patient less annoyance and because it is desirable to accurately locate the bladder at the time of operation.

A *vaginal injection* of bichloride of mercury 1 : 4000 should be given just before the operation. Occasionally the operator prefers to have it given after the patient is placed upon the operating-table.

These preparations should be made in some other than the operating-room, and the patient, after she is ready, may lie down on a bed between sterilized sheets until she is etherized.

The patient should take *no food* on the morning of the operation. If the operation is not to take place until noon or later, a cup of hot coffee or tea, according to her choice, may be given her. Milk should be avoided because of its tendency to form curds (especially under the effect of strong nervous excitement), which may remain in the stomach, and, being vomited during etherization, tend to choke the patient. The patient should remain in bed on the morning of the operation, to avoid feeling faint for want of food.

For the convenience of the nurses the following *formula for ante-operative treatment* has been used in the Woman's Hospital of Philadelphia :

FIRST DAY.

Diet.—Shredded wheat biscuit and glass of hot milk. Hours, 8 A. M., 12 M., 4 P. M., 8 P. M. Whites of two eggs in water and two pieces Zweibach. Hours, 6 A. M., 10 A. M., 2 P. M., 6 P. M.

Medication.—Wineglassful Hunyadi water. Hours, 11 A. M., 5 P. M.

Treatment.—Vaginal douche of bichloride of mercury 1 : 8000; shave abdomen; scrub abdomen with green-soap mixture; give vapor-bath if patient is strong enough; sponge-bath; alcohol-rub; apply bichloride dressing over abdomen, solution 1 : 1000.

SECOND DAY.

Diet.—Shredded wheat biscuit and glass of hot milk. Hours, 8 A. M., 12 M., 4 P. M., 8 P. M. Whites of two eggs in water and two pieces Zweibach. Hours, 6 A. M., 10 A. M., 2 P. M., 6 P. M.

Medication.—Wineglassful Hunyadi water, 11 A. M. and 5 P. M.; salol, grs. v at 8 P. M.

Treatment.—Soap-suds enema; vaginal douche, bichloride of mercury 1 : 8000; vapor-bath; sponge-bath; alcohol-rub; abdomen scrubbed with soap and water, alcohol, and bichloride solution 1 : 1000; dressing of bichloride of mercury 1 : 1000 applied to abdomen A. M. and P. M.

THIRD DAY.

Diet.—Cup of black coffee, 7 A. M.

Medication.—Whisky f3ss, 9 A. M. and 12 M. Strychnia sulph., gr. $\frac{1}{30}$, 10 A. M.

Treatment.—Enema of normal saline solution ; vaginal douche,—bichloride 1 : 8000,—followed by douche of sterile water ; green-soap paste applied over abdomen for one-half hour ; sponge-bath ; alcohol-rub ; abdomen scrubbed ; bichloride dressing over abdomen ; bichloride rub ; sterilized clothes put on ; sterilized wrapping sheet around patient ; operation at 1 P. M.

Coverings.—During the operation the patient should be so wrapped that as little as possible of the body-heat shall be lost.

A warm blanket may be folded over the lower limbs, or wrapped around them and fastened with safety-pins, if it is desired thus to keep the limbs immovable. If the surgeon desires to be able to separate them or bend them from time to time, they may be separately wrapped and pinned in blankets. The clothing of the chest should be folded back, being drawn above the shoulder-blades and on a level with the breasts, and thus fastened with safety-pins. The sleeves may similarly be rolled up above the elbows, sterilized towels being twisted around the uncovered portion of the arm, the end of the twist at the wrist being tucked under the patient's body as the arms are stretched out at her sides or pinned to the pillow if flexed. When the operating-pad is used, the arms can not lie at the side of the body. A blanket

or a piece of flannel may be placed over the patient's chest, or a layer of cotton-wool may be put under the merino vest. If it is necessary to take extra care about keeping the patient warm, a rubber bag filled with hot water may be placed at her feet, or rolls of wool wrapped around the limbs under the blankets.

Different surgeons have various devices for *protecting*

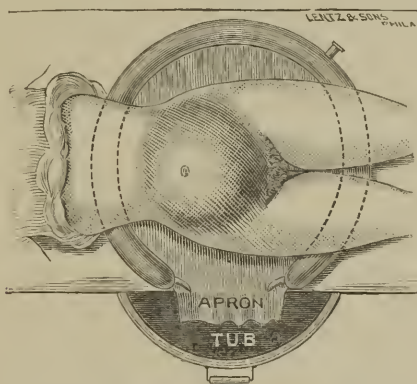


FIG. 26.—ARRANGEMENT OF OPERATING-PAD IN ABDOMINAL SECTION.

the patient's clothing during operation. Special pads of rubber may be adjusted under the patient's back and thighs, which will serve to carry off the water used in irrigation or any liquid spilled. A very simple and effective arrangement is that afforded by three sheets of rubber protective, each $1\frac{1}{2}$ yards wide and 2 yards long. One of these may be slipped under the patient's back,

covering the arms at the side, the ends hanging down over the sides of the table. Another is so adjusted as to cover the chest, being folded under the clothing front and back. Towels may be so arranged in covering the rubber that it does not come in direct contact with the skin. The third piece of rubber sheeting covers the blanket over the lower limbs, being turned down over the edge of the blanket on a line with the pubes. A sterilized sheet may be spread over this rubber sheet and similarly turned down. Sterilized towels may then be placed on the chest, over the sheet covering the lower limbs; also, covering the rubber cloth at the sides of the patient. The dressings applied over the abdomen should not be removed until the operator is ready to proceed to his work.

Some operators prefer retaining a catheter in the bladder as a guide during the operation. In this case a shallow urinal or ordinary soap-dish may be slipped between the limbs to catch the urine as it flows out.

All this adjustment of clothing, protectives, etc., can be made in a very few minutes after etherization is complete.

CHAPTER IX.

PREPARATION OF OPERATOR AND ASSISTANTS.

The operator, his assistants, and nurses should be thoroughly prepared for the grave work they are to undertake by especial attention to personal cleanliness. A full *bath* with an entirely fresh suit of *clothing*, as described in the chapter on the Surgical Nurse, will be sufficient so far as concerns the general preparation of the person. The *hands and arms* will need especial attention for their sterilization. (See Chapter I.)

Dr. W. W. Keen has suggested the following method of sterilization: Cleanse hands with soap and water, applied by a scrubbing-brush for ten minutes. Then rub them thoroughly with a dry paste made of chloride of lime and carbonate of soda. Follow this by washing thoroughly in sterile distilled water. Chlorine is the disinfecting agent in the paste used. It is claimed that this method is less irritating to the hands than the use of solution of permanganate of potassium and oxalic acid.

Before beginning the operation, the operator and his assistants should put on long, white linen *aprons*, enveloping the whole person, which should previously have been sterilized by steaming in the Arnold appa-

ratus for one hour before operation, or by superheating in the sterilizing oven for a similar length of time.

During the operation the surgeon and his assistants should carefully avoid touching anything that may contaminate their hands. Should they have to do so, the process of recleansing the hands should again be gone through with. A frequent dipping of the hands into the warm sterilized water provided will keep them free of blood and also conduce to greater safety in the performance of the operation.

A *summary of directions* to be observed in the preparation for all operations performed in the surgical clinic of the Woman's Hospital comprises in concise form the principles to be observed in all such work.

RULES TO BE OBSERVED IN OPERATIONS.

High temperature and suppuration after wounds or operations are usually due to blood-poisoning, which is caused by infection with vegetable parasites called bacteria. These parasites ordinarily gain access to the wound from the skin of the patient, the finger-nails or hands of the operator or his assistants, the ligatures, sutures, or dressings. Suppuration and high temperature, therefore, should not occur after operation wounds, if suppuration has not existed previously.

Bacteria exist almost everywhere as invisible particles in the dust; hence, everything that touches or comes into even momentary contact with the wound must be germ-free, technically called "sterile." A sterilized

condition of the operator, the assistant, the wound, instruments, etc., is obtained by removing all bacteria by means of absolute surgical cleanliness (asepsis), and by the use of those chemical agents which destroy the bacteria not removed by cleanliness itself (antisepsis). Surgical cleanliness differs from the housewife's idea of cleanliness, in that its details seem frivolous, because it aims at the removal of microscopic particles. Stains such as housewives abhor, if germ free, are not objected to in surgery. The hands, arms, which should be bare to the elbow, and especially the finger-nails of the surgeon, assistants, and nurses should be well scrubbed immediately before the operation, with hot water and soap, by means of a nail-brush. The patient's body about the site of operation should be similarly scrubbed with a brush and cleanly shaven. Subsequently the hands of the operator, assistants, and nurses, and the field of operation should be immersed in or thoroughly washed with corrosive sublimate solution 1 : 1000.

Sometimes the surgeon prefers to use for his hands and arms, and to have the assistants and nurses use for their hands and arms, a saturated solution of potassium permanganate. This is employed after hot water and soap have been used as detailed above, and should be thoroughly rubbed into the crevices around and under the finger-nails. The brown stain which it gives the skin is then removed by thorough washing in a saturated solution of oxalic acid. The oxalic acid solution is next rinsed off by lime-water which has been made

sterile by boiling, and the hands and arms finally washed in a solution of corrosive sublimate 1 : 1000.

Finger-rings, bracelets, bangles, and cuffs worn by the operator, assistants, or nurses must be removed before the cleansing is begun, and the clothing covered with a clean white apron large enough to extend from neck to ankles, and provided with short sleeves tied around the arm above the elbow.

The instruments should be scrubbed with hot water and soap, and all particles of pus and blood from any previous operation removed from the joints. After this they should be boiled for at least fifteen minutes in a one per cent. solution of sodium carbonate, which must be sufficiently deep to cover every portion of the instruments. After cleansing the instruments with soap and water, baking in a temperature a little above the boiling point may be used as a method of sterilizing, or instruments may be placed in the steam sterilizer instead of being boiled. During the operation the sterilized instruments should be kept in sterilized water or a solution of lysol, and returned to it when the operator is not using them.

Natural sponges may be kept in sterile water during the operation. After the blood from the wound has been sponged away, they should be put in another basin containing sterile water and cleansed anew before being used again. Gauze pads or sponges when used are never employed a second time in abdominal operation, but each soiled pad, when received by the nurse, is placed

in a special basin or bucket, to be counted conveniently at the close of the operation, when it is desired to see that no sponge is missing. In minor operations the gauze sponges can be recleansed and used as are the natural sponges. The antiseptic sutures and ligatures should be similarly soaked in sterile water during the process of the operation.

No one should touch the wound but the operator and his first assistant. No one should touch the sponges but the operator, his first assistant, and the nurse having charge of them. No one should touch the already prepared ligatures or instruments except the surgeon and his first and second assistants. None but those assigned to the work are expected to handle the instruments, sponges, dressings, etc., during the operation.

When any one taking part in an operation touches an object not sterilized, such as a table, a tray, or the ether towel, he should not be allowed to touch the instruments, the dressings, or the ligatures until his hands have been again sterilized. It is important that the hands of the surgeon, his assistants, and nurses should not touch any part of his own or of the patient's body, because infection may be carried to the wound. Rubbing the beard or head, or wiping the nose, requires immediate disinfection of the hands to be practised.

The trailing ends of ligatures and sutures should never be allowed to touch an assistant's or surgeon's dress, or to drag upon the operating-table, because con-

tact may occasionally, but not always, pick up bacteria, which may cause suppuration in the wound.

Instruments which fall upon the floor should not be again used until thoroughly disinfected. The clothing of the patient in the vicinity of the part to be operated upon, and the blankets and sheets used to keep her warm, should be covered with dry, sterilized towels, and all dressings should be kept safe from infection by being stored in glass jars or wrapped in sterile towels.

CHAPTER X.

THE NURSE'S DUTIES DURING OPERATION.

After a careful preparation of the room and of the patient, according to the instructions laid down in the preceding chapters, the nurse will need to make the changes in her own toilet necessary to her attendance upon the operation. Her hands and forearms must be rendered thoroughly aseptic, and a clean apron with sleeves put on. The general bath and change of clothing should have been obtained before her preparation of the patient.

When ready herself, the nurse should assist in taking the patient into the operating-room, placing her on the table, and arranging the clothing and protectives. After doing this, if she is not otherwise directed by the surgeon in attendance, she can see to arranging such details as have had to be left to the last; as placing sterilized water of the proper temperature in the various vessels provided for the purposes of irrigation, cleansing of sponges and hands, etc. A good temperature for the water to start with is 110° or 115° F.

She should see that hot bottles or foot-warmers are placed in the bed which is to receive the patient after operation. She should take a careful survey of the

room and see that everything is in its proper place—that is, where it may be most readily obtained when wanted.

After assuring herself that all is right, she should recleanse her hands and take up her station at the stand where she is to manage the sponges.

If natural sponges are used, as rapidly as the soiled sponges are thrown into the cold-water basin, she should cleanse them of blood, rinse them out of the hot water, and place them in the basin on the stand to the assistant's right. In the same way she should receive the soiled gauze sponges, immediately handing a fresh one to the sponger and depositing the soiled one in a vessel provided.

She should keep her eyes open to the needs of the operator and his assistants, supplying clean towels, etc., as needed; directing some one to keep the water in the various basins changed as it becomes soiled, and, finally, assisting with the removal of the soiled clothing, the application of dressings, and the removal of the patient to the bed. While the surgeon is completing his application of the dressings the nurse should turn back the covers from the bed and remove the hot-water bottles, etc., temporarily, placing them under the bed to be out of the way until the patient has been placed in bed, when they may be replaced around her.

The nurse's hands should be frequently cleansed as she passes from one thing to another in her attention to the various details of service. If she has to wait upon the doctors for other things, it is better to have some

assistant in charge of the sponges, who can give the matter her sole attention.

When the patient has been placed in bed and warmly covered with blankets, the hot applications being placed around her, a towel should be placed under her chin, a light basin under the head of the bed, to be on hand should she vomit, and a towel wrung out of cold water may be placed upon her forehead. The blinds or screens should be so arranged that the light in the room may be modified. A chair for the surgeon may be placed at the head of the bed, and, as he or his assistant takes his place there, the nurse may attend to speedily removing the things used during the operation, as tables, protectives, etc., from the room, if the patient lies in the room in which the operation was done. These may be placed temporarily in an adjoining room, until the nurse or some one who volunteers to assist her may see the different articles taken back to their respective places in the house.

Sheets, etc., soiled with blood should be placed in a tub of *cold* water to soak. This will render the washing of them quite easy, as, the blood being well rinsed out of them, they may be placed in the ordinary wash, unless it is preferred to do them separately.

Screens being placed around the bed to prevent the patient's feeling the draught, the windows should be raised and doors opened to thoroughly change the air in the apartment. This may more effectually be done by *pumping the door*, as it is called,—that is, rapidly opening

and closing it, without latching, so as to use it as a fan as it swings upon its hinges.

When the surgeon has to leave the patient, the nurse must take up her station by the bed. Like a sentinel on duty, she should be vigilant in her watch, noting every symptom promptly and meeting its demands. Until the patient is well out of ether the nurse should not intrust her care, even for a moment, to any inexperienced person.

Means for combating nausea and preventing restlessness will need frequently to be employed. Thus, a mustard paste can be placed over the stomach, cold cloths kept to the head, hot vinegar, camphor, or ammonia given by inhalation, or occasional whiffs of oxygen gas. Should these measures fail, the surgeon should be notified of the persistence of the vomiting.

CHAPTER XI.

THE NURSE'S DUTIES AFTER OPERATION AND DURING CONVALESCENCE.

The immediate duties of the nurse after operation will depend much upon the condition in which the patient has been put to bed.

Shock.—If the condition of *shock* be profound, vigorous measures may be necessary to produce a reaction. The application of dry heat (by means of blankets heated in an oven and tucked closely around the patient, and of pieces of flannel heated and placed over the chest immediately next the skin) serves to stimulate the circulation. The extremities may be rubbed with whisky or brandy, the nurse's hands being carried under the blankets to avoid exposure to air. The head should be kept low, even lower than the feet, in order to keep up the circulation of blood in the brain. The foot of the bed may be elevated for this purpose, being raised by means of bricks or stools, or a high chair upon which a stool has been placed may be slipped under the foot-board.

The patient may be fanned, and hartshorn sprinkled on a handkerchief or towel held near the nostrils. Should further measures be necessary, the nurse may, with the sanction of the surgeon, give hypodermic in-

jections of some stimulant. Brandy or whisky may be thus given, or solutions of caffeine, strychnin, digitalis, or nitro-glycerine. These are intended to strengthen the heart's action, and, if doing their work properly, the effect should be soon noted in the pulse. It should grow stronger and slower. The frequency with which these injections should be given, and the amount given at one time, will in every case need to be regulated by the surgeon. Careful instructions must be obtained from him. The full thirty minims of brandy or whisky may be given, filling the barrel of the syringe full. It is better, however, to dilute all these alcoholic preparations one-half before injecting beneath the skin, as they thus cause less irritation. Ten to fifteen minims of tincture of digitalis generally constitutes a dose; it may be diluted in sufficient water to fill the barrel of the syringe. One to two grains of caffeine in solution, or $\frac{1}{30}$ to $\frac{1}{60}$ gr. of strychnin in solution may be given by computing the dose according to the strength of the solution compounded, or by using the tablets which give the exact dosage, and which should be dissolved in distilled water.

The *hypodermic syringe* is a delicate instrument and should be carefully managed and kept in good order, so that it may be ready for use at any time. The barrel may be of metal, glass, or rubber; the needle of gold, silver, or steel. The latter should be very sharp, hence the point should be kept well protected. If dulled, its introduction will cause pain. After use a fine gold wire should be run through it, from the point of the needle

upward, to keep out dust, etc. The barrel should be kept filled one-third full of water, frequently changed, to keep the packing of the piston soft.* Should the packing become loose, draw out the piston and slip the finger-nail around the upper part of the packing, spread it

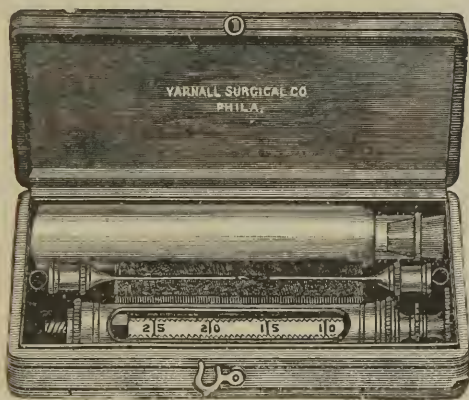


FIG. 27.—HYPODERMIC NEEDLES AND SYRINGE.

a little and soak in warm water for a time. A screw-piece attached to the piston enables a more accurate regulation of the dose, when it has to be estimated in minims. When the syringe is charged, administer the

* Some surgeons prefer anointing the packing with a little gray mercurial ointment to prevent its drying, and not using the water, which, unless it consists of some antiseptic solution, does not keep the syringe in an aseptic state.

dose as follows : Having screwed on the needle, hold the syringe upright and express all air by pressing upon the piston until a drop is seen at the point of the needle. After cleansing the skin surface where the needle is to be inserted, with alcohol rubbed on by means of a piece of sterile gauze, administer the injection in the upper part of the arm or thigh, holding the tissues firmly for a little time to benumb sensation. Insert the needle quickly, but not too deeply, straight down into the tissues and carefully inject the fluid. After withdrawing the needle press the sterile gauze over the point from which it was withdrawn, and rub over the spot for a little time to prevent any of the fluid from coming back.

Copious rectal injections of *normal salt solution* containing ten to twenty grains of carbonate of ammonia, given every three or four hours, with or without the admixture of whisky, digitalis, etc., has very good effect in overcoming shock.

Transfusion of normal salt solution either by the method known as "cellular transfusion," when the liquid is injected into the cellular tissue beneath the skin (as under the breasts or in the groins), or transfusion into a vein may be employed. When *venous transfusion* is used, the nurse should prepare the inner surface of the patient's arm above the elbow, scrubbing with a nail-brush and tincture of green soap, followed by sterile water, alcohol, and a bichloride solution 1 : 1000. Keep the parts wrapped in sterile dressing until the operator is ready. Several forms of transfusion apparatus are

found. The nurse will have to learn how to manage the special apparatus in use, if required to assist in the operation. When a special apparatus is not to be had, transfusion may be effected by means of an ordinary hand-ball or fountain syringe and a small canula. Sterilized *normal salt solution* is ordinarily used for the purpose, because it contains approximately the same amount of salt as is found in human blood—*i. e.*, $\frac{6}{100}$ of one per cent. About one and a half drachms of salt are dissolved in about two pints of distilled water to make the solution.

Sterilization of Normal Salt Solution.—After thoroughly dissolving the salt in the water by stirring with a glass rod, filter the solution into a sterile flask. Place a plug of cotton in the neck of the flask; tie over it a piece of gauze. Place the flask over a Bunsen burner or gas flame in a hot-water bath and keep it there until the water in the bath has boiled for one hour the first day and a half-hour on two succeeding days.

When the patient's strength is low, stimulating or nutrient enemata are kept up. For simple *stimulation* a gill of black coffee, strained and carefully injected into the bowel, is excellent. Another stimulating injection is one consisting of one tablespoonful of whisky and one of elixir of the valerianate of ammonia, to about half a pint of starch- or rice-water. This helps to quiet nervous excitement.

As a *nutrient enema*, milk, beef-tea, broth, etc., alone or combined with stimulants, may be employed. All nu-

trient enemata should be peptonized, to render their digestion and assimilation easier, for there is but little digestive power in the lower bowel.

The amount given to an adult at one time should not exceed one gill, and should not be given oftener than once in three or four hours. It is better to give highly concentrated food rather than to give these injections too frequently, for the bowel is thus irritated and will not retain the food given.

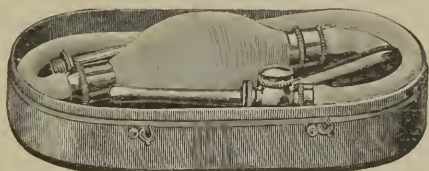
A tablespoonful of expressed beef-juice, which represents the nutriment from one-quarter of a pound of beef, may be combined with a gill of warm water, to which whisky or brandy may be added, from one teaspoonful to one tablespoonful, according to the surgeon's desire.

This injection given once in three hours will represent considerable nourishment. Medication may be combined with the food thus given, as fifteen to twenty drops tincture of digitalis or aromatic spirits of ammonia, or carbonate of ammonia.

The injection should be given at a temperature of 100° F. If too warm or too cold, it will stimulate the action of the bowels.

An ordinary Davidson hand-ball syringe may be used as a siphon for the introduction of this enema from the cup containing it. Care should be taken to inject no air into the bowel. It is well to introduce a vaginal nozzle into the bowel a few minutes before the time for giving the enema, to allow of the escape of any gas that may have collected, and thus better insure the retention of the

food. The bowel when used thus for purposes of nutrition should be washed out at least once daily, to remove any residue that may collect and prevent ready absorption. This may be done by injecting into it a pint of warm water in which has been dissolved a teaspoonful of salt. If this is not voluntarily evacuated, a nozzle may be inserted to draw it off. To administer the stimulating enema itself, all air is first expelled from the syringe by keeping the ends beneath the surface of the mixture and compressing the bulb until no bubbles are produced. A little



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FIG. 28.—DAVIDSON SYRINGE.

vaseline may then be used to anoint the nozzle, which is then carefully insinuated into the bowel. If the direction of the lower bowel is remembered by the nurse as first extending for a short distance toward the vagina and then inclining backward, there will be no difficulty experienced in introducing the nozzle without causing any pain. The nozzle must then be held in place. The patient, if strong enough, can do this for herself, and the nurse will raise the vessel containing the mixture to be injected. As soon as the last of the liquid flows into

the syringe, the tubing should be compressed while the nozzle is withdrawn. This is to prevent the introduction of air into the bowel. A napkin may then be held firmly applied for a time to the anus, until the irritability of the bowel, which may lead to the expulsion of the liquid injected ceases.

The addition of white of egg beaten into the mixture, or a teaspoonful of starch or arrowroot, will serve to make the liquid injected less irritating to the bowel. When the bowel becomes non-retentive, the addition of from ten to fifteen drops of laudanum to the enema may enable it to be retained. Opium in any form should not be used without the express direction of the surgeon. If preferred, a special form of barrel and piston syringe may be used in giving these injections.

The precaution should be taken to inject the fluid very slowly.

Complications.—The greatest danger in the first twenty-four hours after operation is from *hemorrhage*; within the first three or four days *inflammation* is most apt to show itself; and within the first ten days, *blood-poisoning*. The nurse should look frequently at the dressings and the clothing under the patient's back to see if there be any bleeding.

If there is *internal bleeding*, it will show itself by the patient being faint, white or blue around the lips, and the pulse becoming very faint and rapid, or else altogether lost. Hemorrhage occurring in the first twenty-four to forty-eight hours after operation is called *primary*

hemorrhage. *Secondary hemorrhage* comes on generally in the second week.

Reaction after operation is shown by the patient's speaking, the pulse getting stronger, and the skin becoming moist and warm. When this occurs it is undesirable to keep up too much artificial heat about the patient. The heated bottles, etc., around her may therefore be removed.

Immediate Aftercare and Records.—The temperature, pulse, and respiration of the patient should be taken immediately after she is placed in bed, and after that every three hours for the first few days. The temperature is best taken in the arm-pit.

For the sake of uniformity, it is well to make the record of temperature, pulse, etc., come at 12, 3, 6, and 9 o'clock.

The nurse should note all symptoms accurately and report them carefully. If the patient is uneasy or complains of pain, note this down in the record. If she is sick or vomits, report the time, quantity, and appearance of the matter vomited.

During any retching or vomiting the nurse should place one hand over the site of the wound, to prevent undue strain upon the stitches or the forcing out of the drainage-tube.

The quieter the patient is kept the better, therefore no conversation should go on in the room. Do not let the patient lift her head or move her limbs. Report chills or chilliness. Give just as little nourishment as possible

for the first few days, unless directed otherwise by the surgeon.

Diet.—The ordinary rule for feeding after a laparotomy is as follows :

For the first twenty-four hours absolutely nothing, not even ice or water, unless permitted by the surgeon. If the lips and mouth are much parched with ether, a small, soft piece of linen cloth may be dipped in cold water and used to moisten the mouth and tongue.

If the stomach is settled, the patient may, on the second day, take a teaspoonful of barley-water or albumen-water every hour. If this is retained she may, on the third day, have a teaspoonful of milk combined with the barley-water, or beef-juice may be given in the same doses alternating with albumen-water. Many surgeons avoid the use of milk so soon after operation because of the tendency to flatulent distention of the bowels caused by its use. When the bowels have been once thoroughly moved, as they should be by the second or third day, the dietary may be increased. The food at first should be concentrated rather than large in quantity. As the amount is increased the intervals should be lengthened ; thus, a tablespoonful of expressed beef-juice may be given alternating with a tablespoonful of milk, broth, or albumen-water once in two hours.

Should the liquid diet tend to produce flatulence, bread-crumbs may be used with the milk and beef-juice, or a partial semiliquid diet may be substituted ; thus, farina, junket, wheat-germ, thickened milk, koumiss,

toast milk, wine-whey, strained gruel, rice, milk-toast, broths containing rice or barley may gradually be substituted. By the close of the second week the patient may gradually resume ordinary, plain, wholesome fare. The occasional use of a baked apple or a dish of stewed apples will aid in regulating the bowels. Should the patient's stomach be retentive and her general condition good, an occasional drink of very weak, hot tea, in place of the barley-water, on the second and third days will be found, by relieving the feeling of exhaustion, to steady the nerves and add to the patient's comfort.

Persistent Vomiting.—For the control of vomiting various devices have been recommended.

As the vomiting after ether is largely the result of cerebral congestion, it is desirable to keep the head cool by the application of cloths wrung out in ice-water or ice-bags. This relieves also the accompanying headache. Ice cloths applied over the large vessels of the neck and across the entire front of the neck and bathing the face with cold water are useful measures in dealing with nausea.

A mustard paste placed over the stomach will be sedative in its effect upon vomiting. Should the tendency continue notwithstanding this treatment, a feeder full of very hot water containing a small pinch of salt may be sipped by the patient. This will probably come up, but will often serve to quiet the tendency to retching. Another means which is sometimes effectual is that of injecting about half a pint of warm saline solu-

tion (105° F.) into the rectum and having it retained. Inhalations of oxygen gas or spirits of camphor, harts-horn or hot vinegar, aid in the relief of nausea.

Intestinal colic is frequently complained of, especially during the second and third day. It is caused by the accumulation of gas in the intestines. There is apt to be such an accumulation in the large bowel, just below the diaphragm, causing the patient often to cry out with pain. The use of a warm flaxseed poultice over this region will relieve the pain and enable the gas to work down into the lower bowel. The use of the vaginal nozzle in the rectum will enable it often to be expelled and thus relieve the pain. The drink of hot tea or very hot water will also aid in this result. When these measures fail, rectal enemata containing glycerine and turpentine are generally effectual.

Other Symptoms.—Report any cough; state what kind it was,—tight or loose,—how long it lasted. Report hiccoughs. Report also the character of the sleep, as heavy, quiet, uneasy, or if the patient snores. Report if the patient complains of the bandages feeling tight, for inflammation is shown by the distention of the abdomen. Report any change that may be seen in the patient, and send the doctor word concerning it, if it is at all serious.

Catheterization.—The nurse should learn from the surgeon what his desire may be concerning the use of the catheter. Unless special directions are given, the catheter may be used once in six hours.

After hysterectomy it may be necessary to empty the bladder once in every three or four hours, if the stump is so situated as to interfere with its proper distention. The silver or glass catheter should be used, or the soft-rubber catheter. Great care should be exercised by thorough cleanliness to produce no irritation from its use. The instruments, if glass or silver, should be boiled after each use, and kept in the intervals in a weak solution (1 : 40) of carbolic acid. The part around the orifice of the urethra should be carefully cleansed before the insertion of the catheter. The catheter itself is inserted



FIG. 29.—GLASS CATHETER.

more readily if well lubricated with a little carbolized vaseline. Ointments, if used, should be sterilized in the steam sterilizer.

It is best to insert the catheter by sight, the efforts to do it by touch, unless one is especially skilled, often induce irritation, and frequently lead to the introduction of discharges into the urethra. The patient may be so protected by the covers that but little exposure is necessary in its use, a blanket or sheet being thrown over each limb, the urinal being placed between the limbs. Should the nurse be able to use the catheter by touch,

the operation can be performed without any exposure beneath the covers. The index finger of the nurse's right hand should be slipped into the vagina as far as the second joint, and made to follow the anterior vaginal wall down in the median line to the vaginal entrance,

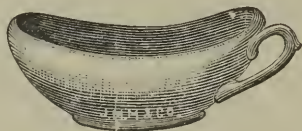


FIG. 30.—COACH URINAL.

when a little elevation of the surface will be felt, immediately above which the orifice of the urethra is to be found. If the finger be held with its palmar surface upward and resting lightly upon this elevation, the finger being held horizontally, a catheter slipped along it will enter the small orifice of the urethra. Should the



FIG. 31.—FEMALE URINAL, OF CHINA OR GLASS.

extremity of the catheter seem to meet with any obstruction after its entrance into the urethra, a slight withdrawal and rotation of the instrument will generally carry it in. After the catheter has been withdrawn the parts should be cleansed and dried.

Should the patient be allowed to pass her own water, the tin slipper urinal or the china or glass urinal made to fit over the vulva may be employed. Should there be difficulty in urination, fomentations applied over the vulva, or hot water in the urinal or bed-pan, will sometimes aid its accomplishment. The urine drawn should be measured and tested with litmus-paper, and a note made on the record of its amount, appearance, and reaction. If there is anything peculiar in its appearance,—that is, if it is smoky, or bloody, or contains sediment,—save it for the surgeon's inspection at his next visit.

Vaginal Discharges.—Napkins containing any discharge that may come from the vagina should also be saved for inspection, and the fact should be reported on the nurse's record.

Temperature and Air of Room.—The temperature of the room should be kept at from 68° to 70° . It should not be allowed to vary. The patient should be carefully kept from all draughts, but thorough ventilation of the apartment should be obtained. Screens carefully adjusted enable this to be accomplished. All discharges, wash-water, etc., should be at once removed from the room. The slop-jar for the wash-water should not stand in the sick-room, but in an adjoining room.

After an evacuation of the bowels especial care should be taken to change the air of the apartment. The bed-pan should always be carefully covered in its removal to the water-closet. A newspaper or napkin may be thrown over it, if it has no cover of its own.

Evacuation of Bowels.—An early evacuation of the bowels is very desirable after an abdominal section. The exact period will be dependent upon the patient's condition. Should all go well and the patient suffer little from flatulence, it is not necessary to make any effort to have the bowels moved before the third day. If the case has been one of resection of the bowels, or if there has been considerable bowel-stitching, no rectal injections should be given without express direction of the surgeon. Liquid food alone should be used for at least eight to twelve days. Means should be taken to secure a movement, when necessitated, with as little straining as possible. A rectal injection of a gill of cotton-seed or sweet oil with a tablespoonful of turpentine may be given, and should be retained, if possible, about two hours, when a soap-and-water injection may be given.

A very good method of securing a movement is by the enema composed of Epsom salts, oil, turpentine, and glycerine, combined with water, which has already been mentioned in the chapter on Preparation of the Patient.

This enema is almost always followed by an immediate evacuation of the bowels.

After the bowels have been moved, any irritability that may ensue may be allayed by the injection of about one gill of warm water containing a little table-salt in solution. This is to be retained.

High rectal enemata of soapsuds containing glycerine

and turpentine, or irrigation of the bowel by large quantities of normal salt solution at a temperature of about 110° F., are sometimes necessary. Long, firm, rubber tubes, called *high rectal tubes*, are employed for the purpose. These require considerable skill for their proper insertion and should not be employed by an unskilled nurse.

Should enemata fail to secure a satisfactory evacuation, salts may be administered by mouth. A teaspoonful or two of Rochelle salts may be given dissolved in a tablespoonful of hot water, and followed by a few sips



FIG. 32.—FEEDER.

of hot water. This dose may be repeated every hour, should the patient retain it, until from four to six doses have been taken or the bowels feel like moving, when it may be followed by the use of a simple soap-sud enema, which will, as a rule, have the desired effect. The salts are best administered in this concentrated form when it is desired to secure prompt effect. The nauseating effect of the dose may be avoided by a little circumspection in its administration. The solution of the salts should be placed in one feeder and the hot water to be sipped in a separate feeder. The patient should be directed to put the spout of the feeder as far back

in her mouth as she can, and to swallow the salts quickly, not allowing any to touch the tip of the tongue and the lips, where the sense of taste is strongest. She may follow this immediately with the sips of hot water from the feeder on hand. The nurse should place her hand beneath the pillow and slightly raise the head of the patient in giving her anything to swallow. A napkin should be placed beneath the chin to prevent spilling on the clothing. This rule should be followed in giving food as well as medicine. Because of the difficulty found in having salts retained by a patient, many opera-

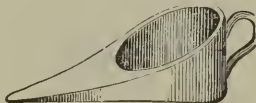


FIG. 33.—SLIPPER BED-PAN.

tors prefer the use of minute doses of calomel—as $\frac{1}{10}$ of a grain—every hour until one, two, or three grains have been taken. Following this, tablespoonful doses of citrate of magnesia may be given in the same way; or divided doses of Seidlitz powder (one-quarter of the powder in one tablespoonful of water) may be given every quarter of an hour until an evacuation is obtained. Other medicaments may be preferred by some surgeons. In any case the nurse must closely follow the directions of the operator.

The use of the bed-pan involves considerable risk to the patient unless great care is used in lifting her. Par-

ticularly is this true in cases of hysterectomy, when there is greater danger from the occurrence of hemorrhage or from formation of clots in the blood-vessels. The nurse should not attempt to perform this duty alone, unless she is fully equal to lifting the patient without jarring. Should the patient be slight and of light weight, the nurse may place one arm under the patient's knees, slightly lifting the hips. With the other hand the bed-pan may be slipped under them.

Should the patient be heavy, she is better lifted by

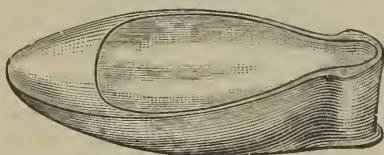


FIG. 34.—EUREKA BED-PAN.

placing one hand under each hip and slightly raising her thus from above. Another attendant can then slip the pan under. The same manœuvre should be resorted to in removing the pan.

Should the patient be too feeble or the nurse unable to get the proper help, the tin-slipper urinal is a convenient receptacle to use, and will involve no lifting. It is well to have two of these to use interchangeably, because of their small size.

Should the nurse not have these, she may use pads made of newspaper and soft rags or oakum, which can

be worked under the patient without any lifting, and which, after use, can be simply rolled up and burned. The amount and character of the movement should be carefully recorded on the report, as also should the fact as to the expulsion of gas from the bowel at any time.

The patient should be scrupulously cleaned after these movements, and the parts kept thoroughly dry. Especial care should be taken to see that there is no moisture under the back and that the skin is kept from breaking. The surface upon which the patient lies should be perfectly smooth. Wrinkles tend to produce sores.

Bed-sores may develop in so short a time, as the result of pressure and moisture, that a nurse must exercise the greatest vigilance in their prevention. Rubbing the back daily, at least once or twice, with a little alcohol and alum serves to harden the skin. This may be followed by rubbing with powdered oxide or stearate of zinc or starch or bismuth subnitrate as a drying powder. As soon as the surgeon permits, the patient should be turned on her side and have her back supported by a pillow. This relieves the pressure and helps in the prevention of bed-sores.

When the skin has broken, the treatment must be changed. Some ointment will be necessary to soothe and heal the raw surface. The alcohol and alum, if used, would cause pain and irritation. Borated or carbolized zinc ointment, applied on lint and held on with adhesive strips, will constitute the best dressing. A

most important feature of treatment is relief from pressure. A ring cushion of rubber may be used for this purpose, being placed beneath the patient in such a way that the bed-sore shall rest over the hole in the ring. When a rubber cushion can not be had, the nurse may make a circular cushion of muslin, filling it with soft rags or hair.

Bed-sores may come on any part of the body which is

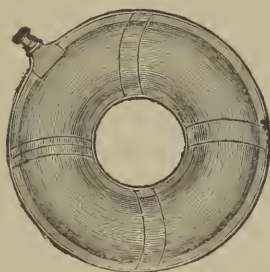


FIG. 35.—RUBBER AIR-CUSHION.

subjected to pressure, as the shoulders, the elbows, the lower part of the back, and the heels. The skin over the sacrum or end of the backbone is probably the most frequent site for such a sore.

Drainage.—Although drainage is comparatively seldom employed, skill in the management of a drainage-tube is one of the most important qualifications on the part of the nurse. The methods employed by different operators vary somewhat, hence the nurse must obtain

explicit directions from the surgeon in charge of the case.

The intervals may be, according to his choice, from once every half-hour to once in twelve hours or more.

Draining of the tube by means of a syringe may be accomplished either with the barrel and piston syringe



FIG. 36.—GLASS DRAINAGE-TUBE.

of glass or hard rubber, to which a piece of rubber tubing is attached, or by what is known as the hard-rubber uterine syringe with long nozzle. These syringes should be kept in the intervals of use in an antiseptic solution, as 1:4000 bichloride of mercury. A small glass graduate is convenient for receiving the fluid drawn from the tube and accurately recording its amount.

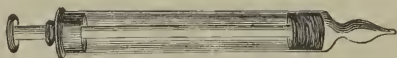


FIG. 37.—GLASS SYRINGE FOR DRAINING TUBE.

In making preparations for draining, the nurse should first arrange the covers over the patient's chest and over the lower limbs, so that just the portion of the body covered by the abdominal bandage shall be exposed to view. She shall then thoroughly cleanse her hands, rendering them aseptic, and loosen the bandage and

rubber dressing. Again washing off her hands in an antiseptic solution, she should lay back the rubber covering of the tube, remove the dressings closing over its orifice, and take up the syringe with which she is going to drain the tube. The rubber tubing or the nozzle is allowed carefully to slip down through the glass drainage-tube into the abdomen. If the extremity of the tube is felt to meet with a point of resistance, it should be drawn back a little before suction is effected by drawing on the handle of the syringe. The syringe should be very carefully and slowly filled and then drawn out.



FIG. 38.—HARD-RUBBER SYRINGE FOR DRAINING TUBE.

A corner of the rubber protective may be thrown over the mouth of the tube until the syringe is emptied and rinsed out, or a piece of sterile gauze caught up by forceps and laid over the mouth of the tube. The contents of the syringe may be emptied into the glass graduate provided. The use of the syringe is continued until no liquid remains. Fresh gauze is then placed over the mouth of the tube. The corners of the rubber protective are folded back over it and pinned, and the bandage, if need be, readjusted. The liquid drained should be placed in a small labeled bottle,—of which a number should be prepared before the operation—and

the date and hour with the record of the amount drained should be placed on the label. This enables the surgeon to obtain an accurate idea of the character of the drainage.

When the hard-rubber syringe is used, care must be taken not to jar the sides of the drainage-tube. Unless the syringe works easily, this is apt to be done. The suction also may be so strong that portions of omentum or bowel may be drawn into the tube through its perforations.

A third method of draining is by what is known as *capillary drainage*: a twist of sterilized cotton or gauze is placed down into the drainage-tube and sucks up the liquid. The dressing over the mouth of the tube thus becomes saturated and requires changing. Some surgeons like the tube cleansed by means of small tampons of sterilized cotton, carried down into it by means of a long, slender pair of forceps, very like the uterine dressing forceps. A new twist of cotton is then placed in the tube. Gauze strips are to be preferred, as cotton is apt to leave shreds behind. The amount of fluid drained should be recorded on the nurse's report, and its character described each time. When the liquid becomes pale, losing its bloody hue, it is pure serum, and the surgeon will probably desire to remove the tube. The nurse will need to prepare a basin containing bichloride solution, about 1:4000, for the doctor's hands, and another with sterile water for the instruments (scissors and forceps) which may be used. A tray containing fresh

dressings and adhesive strips should also be ready. When the stitches are to be removed, which is usually during the second week, similar preparations should be made.

Bathing.—The advisability of bathing the patient during her convalescence should be determined by the surgeon. The cleansing previous to operation having been so very thorough, it is, as a rule, unnecessary to give a full sponge bath and change the clothing for about one week after. It would probably involve too much moving of the patient. The head, neck, chest, hands, and arms may be sponged separately as occasion may call for it. The same may be done with the lower extremities. This is less exhausting than the general bath at one time.

Changing Clothing.—With sufficient care the patient's clothing may be changed without moving her too much. This can only be done properly if the precaution has been taken to have the clothing very loose. In removing the night-dress and undervest, the sleeves should be slipped off on one side and the arm and shoulder covered by a blanket. They may then be taken off the opposite side in the same way. The sleeves of the fresh undervest having been drawn through the sleeves of the fresh night-dress, the two garments may be slipped on at once. The sleeves of one side may be drawn on and then those of the opposite side. An assistant slipping her hands under the shoulders and slightly raising them, the nurse may draw

out the soiled clothing from beneath the back and slip the neck of the fresh undervest and night-dress over the patient's head, drawing the garments well down and smoothing out all wrinkles under the back. The sleeves also should be straightened, so that there may be no feeling of constriction under the arm-pit. The drawers may be changed without much moving, as it is not necessary to draw them under the back and fasten them.

The abdominal bandage and dressings can be better managed when the drawers are allowed to remain as a loose covering for the limbs. The change of stockings involves no disturbance of the patient. Greater difficulty will be experienced in changing the bed-clothing beneath the patient. If the draw-sheet is kept carefully changed, and the covers, a change of the other bed-clothing may be deferred—unless in case of accidental soiling—until the second week. To change the draw-sheet, unpin it from its fastenings and pin one end of the fresh draw-sheet, properly folded, to one end of the sheet to be removed.

As the hips of the patient are slightly raised by the nurse, the soiled draw-sheet can be quickly drawn out and the new one drawn under the patient by an assistant on the other side of the bed. The fresh draw-sheet may then be unpinned from the soiled one and its ends tucked under the mattress and pinned.

The pillow will need to be removed, beaten, turned, and the slips changed quite frequently. The comfort of

the patient is greatly increased by an occasional turning and adjustment of the pillows.

If two beds have been provided to be used interchangeably during the patient's convalescence, the change may be easily effected by lifting the patient from one bed into another.

Lifting of Patient.—It is necessary to have three persons to do this without jarring. All three should stand on the same side of the bed, the tallest nearest to the patient's head, the shortest nearest the feet. The attendant nearest the head should place one arm under the patient's neck, so that the head may lie upon it, and gain a secure hold with the hand of the same arm under the axilla on the opposite side of her. The other arm should be extended just below the shoulder-blades.

The second attendant places one arm under the small of the back and the other arm just below the buttocks. The third assistant places one arm under the knees and the other under the ankle. When all three have their arms properly adjusted, a signal—"Now!"—may be given by one of them, and all must lift simultaneously.

This will enable the patient to be raised without the slightest jar and transferred to the new bed. The latter should have been placed conveniently near, the covers folded back, and the pillow placed so that it will be at the right end of the bed for the patient's head when the nurses turn around in lifting her from one bed to the other.

Change of Bedding.—When two beds can not be had, the least disturbance is probably produced in the chang-

ing of the bed-clothing by unfastening the under-sheet or blanket and the draw-sheet upon which the patient lies, rolling them up from one side of the bed close to the patient, adjusting a fresh draw-sheet to a fresh under-sheet, rolling them up lengthwise and spreading so far as possible over the uncovered side of the bed, tucking them under the mattress at the side. The remainder of the two sheets is gathered into a roll and carried close up to the roll made by the soiled clothing. If the patient can be turned on her side, both these rolls may then be carried well under her as she turns on the opposite side, and in turning back she will turn over them, thus enabling both the soiled clothing and the fresh to be carried through to the opposite side and properly adjusted to the bed, the soiled clothing being removed. Should it be considered unwise to let the patient roll on her side, her hips may be slightly lifted and the rolls of soiled and fresh clothing drawn through by an assistant who stands on the opposite side. The same manœuvre can be carried out with the shoulders and the lower extremities until the fresh clothing is properly arranged.

Another method is that of drawing the patient well to one side of the bed on the sheet upon which she lies. The fresh sheets may then be placed over the rest of the bed and gathered into a roll close to the patient's side. The patient may then be lifted or drawn over on to the fresh sheets. The old sheet may be gradually removed from under her, and the remaining portion of the fresh

sheets unrolled and spread over the uncovered portion of the bed.

The covers can be changed by spreading the fresh sheet and blanket over the former covering, and working the latter down to the foot of the bed beneath these, thus removing them.

Massage.—The limbs of the patient frequently become benumbed and ache for want of exercise. The nurse may help this by rubbing them and gently kneading the muscles from time to time. It is not necessary to remove the clothing for this. There is generally no objection to slightly bending the limbs at the knees and supporting them on a pillow. Small pillows six inches wide and eight to twelve long, made of hair, are convenient for placing around the patient to remove pressure and produce slight changes in the position, which are restful.

Bandage.—Before sitting up,—which is usually permitted about the close of the third week,—the patient should be fitted with a bandage for the support of the abdominal walls. As a rule, this bandage should be worn for one year, being removed only at night or when the patient lies down. This is to prevent rupture at the site of the incision. The London Supporter (Fig. 39) is a firm bandage, which serves a good purpose. When there is not much strain upon the abdominal walls, the ordinary elastic abdominal bandage does very nicely. Great circumspection should be employed regarding the patient's sitting up after she has sufficiently convalesced to do so.

Sitting Up.—The period at first should be short. It is better to lift the patient out on a sofa or reclining-chair for a change, rather than allow her to overexert herself. The surgeon should be carefully consulted as to the amount and character of the exercise the patient may take.

Hysterectomy.—The treatment of hysterectomies, both before and after operation, is the same as that of

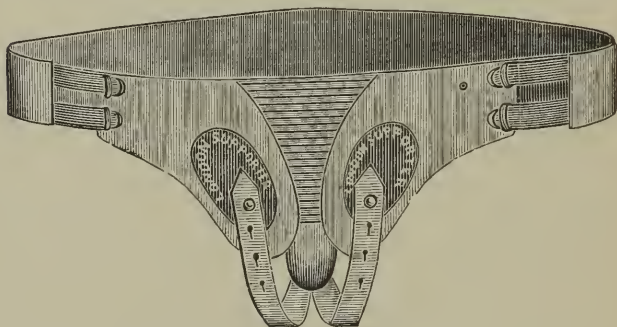


FIG. 39.—LONDON SUPPORTER.

an ordinary section. Occasionally there may be the additional care of a clamp, the screw of which will require tightening from time to time, if directed by the surgeon. The stitches are usually removed in eight to ten days.

Hysterectomy patients are usually not permitted to be turned before the twelfth or fourteenth day, and not then unless the surgeon directs. In the method now usually employed, that of dropping the pedicle into the

pelvic cavity, the management is practically identical with that of any other abdominal section.

When, as formerly, the stump was treated outside of the abdomen, the operation was said to be done by the extra-peritoneal method. When it is dropped it is, however, also extra-peritoneal, as folds of peritoneum are stitched together over the stump as it lies in the pelvic cavity. This operation is distinguished as that of *supra-vaginal amputation*, while when the entire neck of the uterus also is removed, it is *total extirpation*.

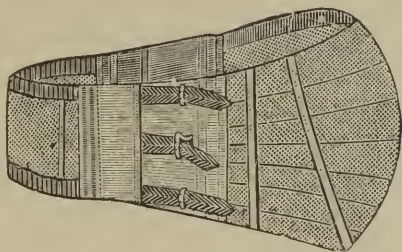


FIG. 40.—ELASTIC ABDOMINAL BANDAGE.

The general directions given in this chapter may be greatly modified by different surgeons. The nurse must be prepared to respond to the requirements of the surgeon in every case. A nurse should never let it be known that her views differ from those of her superior officer. It is right always for the surgeon or physician to plan the campaign in the management of a case. The nurse, if she serves under him, has but one duty—to obey.

CHAPTER XII.

MANAGEMENT OF COMPLICATIONS.

Rise of Temperature.—This symptom always should cause anxiety after an operation, especially when the temperature exceeds 102° F., for it is so frequently the indication of blood-poisoning in one or another form. The rise, however, may be due to some other cause, as a cold, bronchitis, ague, or it may denote the approach of a menstrual period, or may accompany a discharge from the uterus, which is not infrequent a few days after operation upon the pelvic organs. Extreme excitement may similarly produce an elevation of the temperature for a time. The treatment of this fever must depend largely upon the cause.

When the temperature rises above 102° and there is a similar increase in the pulse, some means should be taken for its reduction. An ice-cap may be placed upon the head and should be kept on until the temperature has steadily gone down, remaining below 100° F. The face, hands, and wrists may be frequently sponged with cold water. Wet-packing is sometimes employed where the temperature is not reduced by the ice-cap.

The arms may first be packed in wet towels wrung out in ice-cold water, and kept moist by water squeezed

upon them from a sponge. The lower extremities and the chest may require the same treatment, if the application of cold to the arms fails to reduce the temperature. A rubber protective will need to be slipped under the patient when this treatment is carried out, to prevent wetting of the bed-clothing.

An ice-bag is sometimes directed to be placed over the heart for the reduction of temperature. When these means are employed, the pulse and temperature must be frequently taken, as great depression may occur suddenly. No heroic measures should be employed without the full sanction of the surgeon. The use of antipyretic remedies will also be directed by him.

The ice-cap ordinarily employed in this country is a simple rubber bag, which is filled one-third full of pieces of ice about the size of a walnut. All air should then be squeezed out of the bag and a piece of string fastened securely around the neck. The bag is then placed on top of the patient's head, a single layer of muslin or toweling intervening between them. If the bag is filled more than one-third full, it will not adapt itself well to the shape of the head. Two bags should be in use at the same time, so that the nurse may have one to immediately replace the other when refilling of the bag is necessary. The ice melts so fast when the fever is high that the bag will probably need refilling about every twenty minutes or half-hour. It is utterly useless for the purpose of reducing temperature after the ice has melted.

The nurse will need to have ice close at hand for the

purpose. A block wrapped in flannel and kept in a covered vessel in a cool part of the room, or in the adjoining hall, will enable her to keep up this application without much difficulty. With a large steel pin and with the piece of ice wrapped in a cloth, the nurse may noiselessly break off the pieces required for filling the cap. The pin pressed firmly into the ice will cause it to separate into pieces, which can similarly be broken into smaller pieces if desired. When the rubber ice-bag can not be had, a pig's bladder, obtainable at most drug-stores for ten cents, serves the purpose very well, although it is more perishable.

Pliable metal coils, or rubber, through which cold water may be made to circulate continuously, are sometimes used for reduction of temperature. These are called Leiter's tubes. They may be adapted for application to various parts of the body. The coils forming a cap are used for application to the head.

A broad tape fastened under the chin holds the cap to the head. A reservoir containing the ice-water is placed above the level of the patient's head, and is connected by a piece of rubber tubing with the coils. A similar tube connected with the other end of the coils is placed in a receiving vessel on the floor. A slight suction made on the lower tube, either by the mouth or by means of a barrel-and-piston syringe, establishes the siphon action. When the lower vessel is nearly full, the position of the two vessels may be reversed. This continuous flow of water through the spiral cap may be kept

up any length of time required. The water in the supply vessel should contain ice.

Some surgeons use by preference Leiter's temperature regulator, a long and narrow set of coils, which may

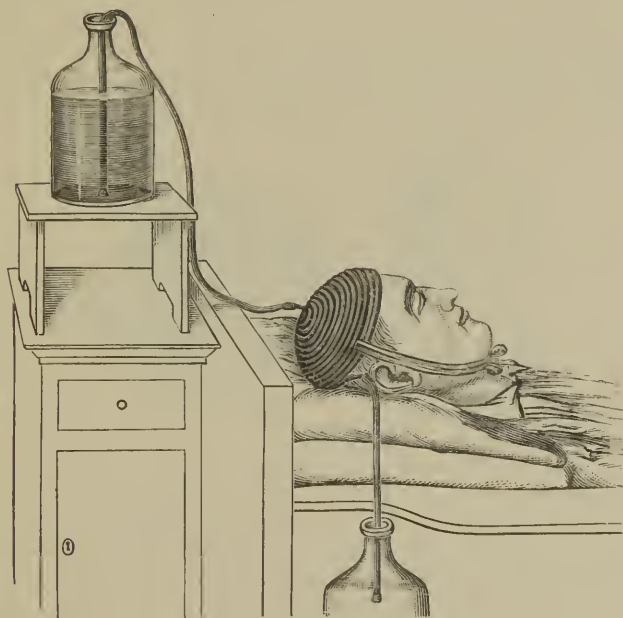


FIG. 41.—LEITER'S TUBE CAP.

be bent so as to shape it to the back and sides of the head. It is thought that better results are obtained by the application of cold to this portion of the head.

To mould these coils they should be bent over some firm convex surface, as the thigh, for, if bent by the hands, the coils will not lie parallel and they will be apt to become leaky. This regulator is connected in the same way as the cap with the supply and receiving vessels.

Thornton's ice-cap consists of a series of coils of stout gutta-percha tubing, joined together or fastened on to a cap of rubber dam so as to fit the head. Thus, a uni-

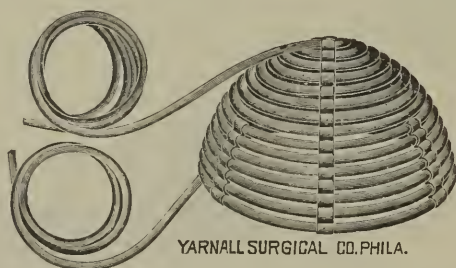


FIG. 42.—RUBBER WATER-COIL.

formly cool, smooth surface touches the patient's head. At the top of the cap one end of the tubing is connected with a pail filled with water containing ice. The tubing at the lower border of the cap terminates in a long, free end which passes from the side of the patient's head into a bucket beside the bed.

The pail supplying the water is fitted with a stop which may be regulated so as to allow the water to flow slowly.

As the receiving pail fills, the water may be baled out and returned to the pail above. Ice must be kept supplied in the upper pail. Care must be taken in the use of the cap to see that the free tubing does not bend at an angle at any point, and so obstruct the flow or escape of water.

Septicæmia, Pyæmia, Peritonitis.—Septicæmia is a diseased or poisoned condition of the blood produced by absorption of putrid matter.

Pyæmia is a similar condition produced by purulent infection.

Peritonitis is inflammation of the peritoneum.

The relations between septicæmia and peritonitis appear to be very close.

The characteristic symptoms of the latter are violent pains in the abdomen, increased by the slightest pressure, often by simple weight of the bed-clothes, the pulse becoming very rapid and wiry. The temperature is not correspondingly increased, although somewhat elevated. These symptoms of acute peritonitis may pass into a condition indicating septic infection.

Septicæmia generally sets in between the second and the seventh day, with vomiting, steady rise of temperature, and simultaneous rise of the pulse.

The complexion becomes muddy, the expression dull, a dark-red flush on the cheek; spirits at first depressed, later apathetic.

Condition of tongue and skin varies considerably; as a rule, tongue rough, red, and dry, and skin dry until

near death. The tongue may remain moist and skin act profusely throughout.

It is a bad sign when flatus does not pass from the bowel, as is tympanites or distention of the bowels with gas. Another highly unfavorable symptom is persistence of vomiting, especially when the vomited matter is no longer frothy and white, but becomes green or dark.

The treatment of septicæmia is preventive rather than curative. Septicæmia when it has once set in is very unamenable to any kind of treatment. The surgeon sometimes reopens the abdomen and washes it out. The nurse will need to make the preparations as nearly as possible like those she made for the original operation. Thorough asepsis should be maintained.

For the vomiting, if it be bilious or dark, the stomach may have to be washed out. This may be done by means of the stomach-pump or a piece of long rubber tubing fitted with a funnel. A weak solution of warm salt water is used for the purpose, being poured in through the funnel, and after sufficient has been introduced into the stomach to fill it, as will be indicated by the retching of the patient, the funnel may be inverted and placed over a waste pail below the patient, and, the tube acting as a siphon, thus carries off the fluid from the stomach. The *introduction of the stomach-tube* requires no little skill on the part of the nurse. As a rule, the surgeon attends to the matter himself. Should the nurse have to do it, she should proceed as follows:

First, lubricating the outside of the tube with a little glycerine, she places the end of it in the patient's mouth and carries it back into the œsophagus, depressing the tongue by the tube as it is carried backward. A black ring on the tube, as it approaches the teeth, indicates the point at which the nurse may regard the tube as sufficiently introduced, the ring being on a line with the teeth. The funnel is then connected with the outer end of the tube (if one does not form a part of the apparatus), and the nurse, standing at a height on a stool or chair, pours in the salt or boric acid solution slowly, at a temperature of from 100° – 105° F. The patient will need to be well protected, a rubber cloth being fastened around the neck. In withdrawing the tube it should be done as quickly as possible to prevent retching. Shortly after each washing some liquid nourishment with the addition of stimulants, if necessary, may be given. Small doses of champagne given with cracked ice are often sedative in their effect, one to two teaspoonfuls being given every hour.

Before the vomiting has become so excessive, or before the stomach washing is attempted, it may be found to be of advantage to let the patient sip very hot water containing just a pinch of salt. This measure has been found, as a rule, preferable to the use of bits of ice, especially as it affects the patient afterward in her ability to take food and retain it.

The temperature, if over 102° , should be reduced, if possible, by means of the ice-cap or other apparatus of

the kind. After the reduction of temperature and washing out of the stomach, with the obtaining of free evacuations from the bowels, some cases of septicæmia get better, because the poison is removed from the system by these means. Beef-tea or milk enemata, combined sometimes with stimulants, will be needed in addition to what the patient takes by mouth, for the treatment of septicæmia requires the support of the patient's strength for combating the poison.

Abdominal Distention.—If flatus does not pass freely from the bowel, especially after the insertion of the rectal tube, enemata containing salts, glycerine, turpentine, etc., may be used. Should these prove unsatisfactory, calomel or salts may be given by the mouth. Because of their depressing effect, it is better to give salines in small doses, as one teaspoonful of Rochelle salts dissolved in a tablespoonful of water once in an hour until three or four doses are taken.

Where *peritonitis* exists, especial reliance is placed, in this day, upon the saline or mercurial treatment. An early and thorough evacuation of the bowels, with discharge of flatus, should be obtained. The means employed may be the same as those above mentioned, doses of Rochelle or Epsom salts being administered by mouth, or, if the stomach is not retentive, by rectal enemata.

The pain arising from the tendency to accumulation of gas in the transverse colon and consequent pressure upon the diaphragm may be relieved by the application

of warm flaxseed poultices over the lower portion of the chest, renewed once in two hours or every hour.

The discomfort caused by the weight of the bed-clothing may be relieved by the use of a bed-cradle.

A *bed-cradle* can be readily improvised by means of a large barrel-hoop divided into two equal parts. The two semicircles thus produced are then fastened together in the middle with their convexities looking the same way. This forms a coop-like arrangement, which, placed over the patient's body as she lies in bed, sup-

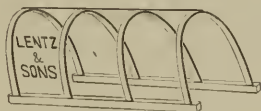


FIG. 43.—CRADLE FOR SUPPORTING BED-CLOTHES.

ports the bed-clothing quite as well as a more expensive cradle.

Opium is but little used by most operators in the management of peritonitis. The nurse would, however, think of using no remedy, unless the warm poultice, without the direction of the surgeon. The free use of salts has been found to afford speedy relief from pain.

Internal Hemorrhage.—This may come about from a slipping of the ligature or from vessels which have been severed by the breaking up of adhesions. The danger is greatest in the first day or two, primary hemorrhage occurring, as a rule, within twenty-four to forty-eight hours.

The symptoms by which the nurse will recognize this condition are faintness, paleness, restlessness, a rapid, thready pulse. The surgeon should at once be sent for. The nurse can do little for this condition, excepting to keep the patient from fainting, by lowering her head and giving her stimulants in small doses, as one teaspoonful of whiskey or brandy in cold water once in ten to fifteen minutes, and stimulating respiration by inhalation of hartshorn, etc., until the doctor comes. So far as possible the nurse should arrange to have everything in readiness should the doctor suddenly decide to reopen the abdomen. Especially should care be taken to see that a supply of hot sterilized water shall be in readiness.

Intestinal Obstruction.—This may occur early or late after an operation. The intestines may from various causes be bent or constricted so as to prevent the passage of their contents beyond a certain point.

This obstruction may cause fatal collapse or even perforation of the intestines.

The symptoms are: abdominal pain; constant vomiting, which may become fecal; distention of the abdomen; without a marked rise of the temperature.

Much may be done to prevent danger from this source by proper attention to the bowels before operation.

Change in the position of the patient from one side to another, or inverting the patient by elevating the foot of the bed considerably above the surface, so that the

intestines are carried toward the diaphragm ; the use of the high rectal douche, several quarts of water being allowed to flow into the intestines with the patient in an inverted position—any of these methods will sometimes straighten out the bend or loosen the constriction of the intestines.*

It has sometimes been found necessary to reopen the abdominal wound and thus to remove the obstruction.

Fæcal Fistula.—This is a small opening in some part of the intestines which communicates with the abdominal wound, opening on the surface of the body, and permitting the contents of the bowel to pass out at this point. These openings are produced from various causes and are sometimes very slow to close up. They usually occur in the track of a drainage-tube.

The nurse must exercise the greatest care in changing dressings as often as may be necessary and preventing the contaminating effect of the fæcal matter.

Urinary fistulæ may also occasionally occur, and urine flow from the site of the wound. The attention of the surgeon must be called to the matter as soon as

* In the occurrence of obstruction of the bowels, the use of Rochelle salts by mouth every hour, with rectal enemata of soap and water every hour, retained as long as possible, may be sufficient to produce a free evacuation. It is well to combine from a half to an ounce of turpentine with the injection. If there is nausea and Rochelle salts can not be retained, liquorice powder, citrate of magnesia, calomel, etc, may be used. Poultices of flaxseed and mustard may at the same time be used over the abdomen.

possible, meanwhile dressings kept as dry as possible by frequent changing.

Abscesses.—These may be suture-track abscesses, or may come in the abdominal walls at a point whence the drainage-tube was removed, or may be formed by morbid changes in the pedicle. The nurse should be quick to report any redness or irritation about the wound, as an abscess may thus be averted. When it once occurs, the abscess should be thoroughly evacuated and the dressings kept properly changed.

Thrombosis.—By this is meant the formation of a clot in a vein, by which an obstruction to the circulation is produced. This causes a swelling of the limb. It is not an infrequent result after the removal of a simple ovarian tumor, particularly if it be a very large one. It is generally caused by the patient's attempting to walk or stand too soon, as at the end of a fortnight. In many of these cases a previous history of swelling of the limb can be obtained. Very frequently the patient simply complains that one leg feels bigger than the other. On examination the tissues over the tibia or shin-bone may seem swollen, but there will be no especial tenderness.

Phlegmasia.—By this is meant an inflammation of the veins caused by a similar obstruction and the production of inflammation in the walls of the veins. The swelling in these cases is generally marked and extends to the thigh; enlarged, tender, cord-like veins may be felt in the groin, or under the knee, or elsewhere. There is

apt to be considerable constitutional disturbance, fever, and severe pain.

Whenever any sign of thrombosis occurs, the patient should be kept in the recumbent position. The swollen limb should be kept warm by the application around it of cotton or wool. Over the swollen, cord-like veins a warm flaxseed poultice may be placed for the relief of pain. The application on lint, beneath this poultice, of an ointment, made by combining equal parts of belladonna and iodine ointment, will often serve to allay more quickly the swelling and pain. The limb should be elevated by pillows or a fracture-box, forming an inclined plane. The bowels should receive careful attention, free purgation being obtained by any means the surgeon may prescribe. It is of extreme importance to keep the limb still, even after the swelling has subsided. The patient must not be permitted to place her foot on the ground until the surgeon gives his full consent, for this complication is a most serious one, and is a cause for anxiety.

Pulmonary Embolism.—This is a fatal complication produced by a small clot being swept through the current of the circulation into the pulmonary artery, forming thus an obstruction to the circulation and producing instant death. Young, active patients, whom it is difficult to keep sufficiently quiet after an operation, are especially in danger from this cause.

Cases have been reported where patients died suddenly from this complication days and even weeks after an

operation, when all appeared to be going on well. It may occur, as a result of overexertion, in any disease accompanied by debility or exhaustion.

Parotitis.—Inflammation of the parotid glands, such as occurs in mumps, is sometimes found as a complication after abdominal section. In some cases this is simply a temporary swelling which disappears in a few days; in others it may be septic in character, when suppuration may result, or even inflammation of the periosteum and destruction of the lower jaw. The management, if septic, will be that of septicæmia—supporting in character. Such local applications for relief of pain, etc., must be employed as are ordered by the surgeon.

Palpitation.—Severe attacks of palpitation are apt to occur after abdominal section, and most frequently occur at night. It is supposed that these are caused by changes in the circulation due to removal of a tumor, and, possibly, in large part to enforced lying on the back for a considerable length of time. A half-teaspoonful of aromatic spirit of ammonia in two tablespoonfuls of water will give the patient great relief. The symptom may greatly alarm an inexperienced nurse, but an expression of fright on her part only makes the patient worse; hence she should not allow her anxiety to be seen. The condition is not a dangerous one.

Cystitis.—Inflammation of the bladder quite frequently occurs as a complication after abdominal section. The patient complains of pain in the lower part of the abdomen, and feels cutting pains on passing her urine.

Sometimes the irritation shows itself simply in a frequent desire to pass water. The urine is generally thick with ropy mucus, and contains a considerable amount of sediment. The difficulty of passing water in urinals or bed-pans in the recumbent posture is partly responsible for this. The more frequent cause is improper catheterism. The awkward use of the catheter, which leads a nurse to carry discharges from the vagina into the urethra and bladder, or the use of a catheter which is not aseptic, not having been kept properly cleansed, are prominent causes for such trouble. The free use of flax-seed-tea or barley-water, with a stoppage of the use of the catheter, will often be sufficient to put a stop to the suffering. The use of medicinal remedies in case of too great acidity or alkalinity of the urine will have to be directed by the surgeon. The nurse should have a little litmus-paper, which can readily be obtained at any apothecary's, and test the urine, so that she can report its reaction to the surgeon. If the blue litmus-paper is turned a decided red when dipped in the urine, the secretion is too acid; if the pink litmus be turned blue, we have an alkaline urine.

Washing Out of Bladder.—It is sometimes necessary, for the comfort of the patient, to wash out the bladder with some soothing solution, as a saturated solution of boric acid. The apparatus necessary for this is simply a soft-rubber Nélaton catheter, a small funnel which can slip into its outer end, and a small pitcher containing the solution to be used in the process. The solution should

range in temperature from 100° – 105° F., not higher. The patient being placed on the pan, the urine contained in the bladder is first entirely drawn off by means of the catheter; its outer extremity is then elevated, the funnel fitted in, and the solution poured in gently until the patient experiences a sense of distention of the bladder; the funnel may then be inverted over the bed-pan, and the liquid allowed to flow out. This cleanses the bladder of all debris. It may then be refilled to distention, and again emptied so long as the liquid does not come away clear. After the liquid becomes clear the bladder may be refilled with the solution and the catheter withdrawn, allowing the solution to remain in the bladder for its medicinal effect upon the inflamed mucous membrane. The patient will probably retain this some little time before passing it.

The *return* or *double channel catheter* is sometimes used in preference to the apparatus just described, but is not so convenient. The nurse should never attempt washing out the bladder without the surgeon's instruction and sanction.

Occasionally the nurse is directed to place warm flax-seed poultices over the lower part of the abdomen for relief of the bladder irritation. This can not always be resorted to, because of the close proximity of the wound to the part. Should the poultices be ordered, the nurse should see that they are changed with sufficient frequency to keep them warm, as they are worse than useless when cold. A poultice of ordinary size, if well

covered with oiled silk and a layer of cotton or wool, will retain its warmth about two hours.

Improper Action of Kidneys.—For this complication use dry heat—keep the patient as warm as possible, and sustain the strength with stimulating injections, alcohol baths, etc., and such medication as the doctor may prescribe. Keep the patient warmly wrapped.

Tetanus.—This is a disease which consists in a permanent contraction of all or some of the muscles. Its characteristics are: closure of the jaws, difficulty or impossibility of swallowing, rigidity of the limbs and trunk. The trunk is sometimes curved forward (*emprosthotonus*), sometimes backward (*opisthotonus*), and sometimes to one side (*pleurothotonus*).

When tetanus is confined to the muscles of the jaws, it is called *trismus*.

It is a most formidable condition. This disease, although rare after abdominal section, may occur, as after other operations.

Treatment is of little avail. It must be treated here as where it complicates other diseases—that is, by blood-letting, cold and warm bathing, anæsthetics, opiates, etc., according to the surgeon's direction. The nurse's duty is to report the first indication of such an occurrence.

The surgeon may desire to reopen the abdomen for examination of the stump for any special source of irritation.

Passage of Ligatures.—When the pedicle of the tumor suppurates, the ligatures may be discharged

through the bladder, or through the bowels, or through an abscess of the abdominal wall. This may occur at varying lengths of time after the operation.

Menstruation after Abdominal Section.—A show of blood frequently occurs a few days after operation, particularly after ovariectomy or operation upon the uterine appendages. There is almost always some rise in temperature accompanying this show, and frequently depression of spirits. The pulse, too, may rise considerably. This flow may last from a day or two to a week or two, varying in quantity. The surgeon will sometimes direct the use of vaginal douches of boracic acid or bichloride solution once or twice daily.

The patient must always be advised to keep very quiet during the first three or four periods after an abdominal section for disease of the pelvic organs, as there may be hemorrhage from the stump.

Pneumonia and pleurisy may occur as complications, being sometimes the result of exposure of the body during operation, or the result of irritation of the air-passages by the anæsthetic.

Septic pleurisy and septic pneumonia usually occur later. The pneumonia may result from septic emboli from a focus of infection at the seat of the operation lodging in the pulmonary capillaries.

The symptoms are: Difficult and rapid breathing; a short, hacking cough; muco-purulent and rusty sputum; high temperature; rapid pulse; prostration.

The treatment will consist in protection of the chest

by a cotton jacket, the application of turpentine stupes or warm flaxseed poultices under this for pain. Dry-cupping of the chest may be called for. The condition of the heart must be watched, and stimulants used freely when indicated. The food should be very nutritious. On account of the danger of heart-failure, the patient should be kept strictly in the recumbent position. Such internal remedies must be given as are ordered by the surgeon.

CHAPTER XIII.

THE PELVIC ORGANS IN WOMEN.

These are divided into the external and internal organs of generation. The external organs are also called the *pudenda* or *vulva*.

Immediately above the pubic bone, or anterior border of the pelvis, is a cushion of fat, usually covered with hair. This is called the *mons veneris*.

On each side of the opening of the vulva are the *labia majora*, or *large lips*. Lying beneath these, and concealed by them in young women, are two thin folds of flesh, named the *labia minora* or *nymphæ*. They join together above, and at their junction is a small, projecting body called the *clitoris*.

The small, triangular space between the clitoris and the nymphæ is the *vestibule*.

The opening of the urethra (the *meatus urinarius*), through which the urine escapes from the bladder, is in the middle of the lower border of the vestibule.

It is very important that the nurse should know the exact position of the meatus urinarius, as she will frequently be called upon to pass the catheter.

Below the vestibule is the orifice of the *vagina*, the canal leading to the uterus or womb. In virgins a deli-

cate membrane, usually crescentic in shape, blocks the entrance to the vagina. This is the *hymen*.

The hymen is usually ruptured at marriage, but a

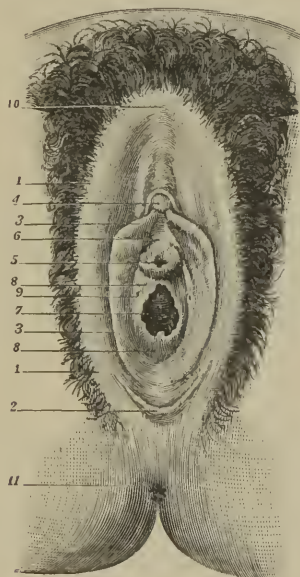


FIG. 44.

1. The right large lip. 2. The fourchette. 3. Right nympha. 4. Clitoris. 5. Urethral orifice. 6. Vestibule. 7. Orifice of vagina. 8. Hymen. 9. Mons veneris. 10. Anal orifice.

woman may be a virgin, yet have no hymen. In some cases it persists even after marriage and offers an obstruction at childbirth. A woman who has borne children has a few fleshy projections at the orifice of the

vagina, the only remains of the hymen, called the *caruncule myrtiformes*. Between the vulva and the anus is a mass of flesh, the space on the surface measuring $1\frac{1}{2}$ inches in length. During the birth of the child this becomes greatly distended, and stretches like rubber. This is the *perineum*. It may be torn during labor to a greater or less extent; sometimes it is completely torn into the bowel.

That part of the perineum in the virgin which forms the posterior border of the vulva is called the *fourchette*. It is merely a fold of skin, and is almost always torn in a first labor.

Behind the perineum is the *anus*, or orifice of the rectum—the lower part of the bowel.

The *vagina* is a canal connecting the external with the internal organs of generation.

The *uterus* is at the top of the vagina. In front of the uterus is the *bladder*, and behind and to the left the *rectum*.

A secretion of mucus keeps the vagina moist. There should, however, be no discharge in a perfectly healthy woman. During pregnancy, and as a result of ill-health or local inflammation, the natural secretion may be greatly increased, and the patient is then said to have *the whites*.

In labor the discharge is very greatly increased, so as to aid the birth of the child.

The *uterus* is a pear-shaped organ, 3 inches in length, $1\frac{1}{2}$ inches in breadth, and about 1 inch in thickness. It

weighs a little over an ounce in its normal condition in a virgin. After child-bearing it remains larger and heavier than before. That portion of the uterus which communicates with the vagina is called the neck, or *cervix*. The chief portion of the organ above this is called the *body*, and the rounded upper surface the *fundus*. The opening in the cervix which communicates with the

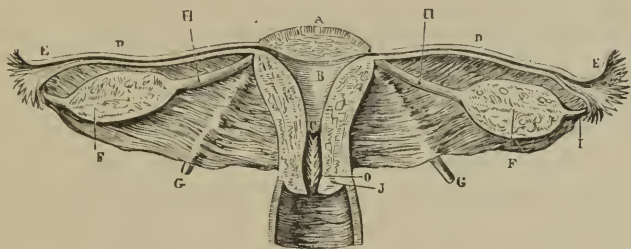


FIG. 45.—CAVITY OF THE UTERUS AND FALLOPIAN TUBES.

- A. Superior border or fundus of the womb. B. Cavity of the womb. C. Cavity of the neck of the womb. D. Canal of the Fallopian tube. E. The fimbriated extremity. F. The ovary. G. The round ligament. H. The ovarian ligament. I. The uterine extremity of the Fallopian tube. J. The vagina.

vagina is called the *os uteri*. That portion of the cervix in front of the os uteri is the anterior lip, while that part which lies behind is the posterior lip.

The Fallopian tubes are two canals which pass from each side of the upper portion of the uterus. They are from 3 to 4½ inches long, and will admit the passage of a bristle.

Each ends in a trumpet-shaped opening surrounded by a fringe of small projections called *fimbriæ*. This is called the fimbriated extremity. When the ovum (or egg) escapes from the ovary, it is received by the Fallopian tube and reaches the cavity of the uterus in this way.

The *ovaries* are two small, flattened bodies about an inch long and half an inch thick. They lie about an inch from the fundus of the uterus on each side, in the folds of the broad ligament. The *broad ligaments* are folds of peritoneum, a thin glistening membrane which covers the uterus and all the pelvic organs, and by means of which the uterus is suspended in the pelvis. The bladder and rectum being covered with the same tissue, there is an intimate connection between the three, so that if one is deranged, the others are likely to be so also.

The breasts are considered as belonging to the external organs of generation. They are two glands situated on the front of the chest, one on each side of the breast-bone. They vary in size and shape in different women, and during pregnancy they enlarge greatly.

They secrete milk for the nourishment of the child. The *nipple* at the apex of the gland is a conical-shaped projection. The milk-ducts all come toward it from the different parts of the breast and open on its surface. The *areola* is a pink or brown circle which surrounds the nipple.

There is an intimate connection between the breasts

and the uterus. Pain in the breast may be the result of disease of the uterus.

Menstruation is a bloody discharge from the uterus every month. It begins usually about the age of fourteen, and recurs every month except during pregnancy or while a woman is nursing. It ceases at the change of life or *menopause* (between forty-five and fifty).

At *puberty*—that is, when this function first appears—the girl becomes a woman, the breasts enlarge, and the pelvis increases in size. The organs of generation become ready to perform the functions of reproduction.

The menstrual flow recurs every twenty-eight days and lasts about four days. The quantity of blood lost at a period is from four to eight ounces. Different women vary much in this respect. The discharge is blood mixed with mucus. Its color is dark red. Any peculiarity in color or the appearance of any clots in the discharge will need to be noticed by the nurse, and the discharge kept for the doctor's inspection. There is usually a feeling of discomfort at the menstrual period, with headache, pains in the back, breasts, etc. These symptoms are more severe in some women than in others.

Conception most usually takes place immediately or very soon after a period. This is not an invariable rule, as women have become pregnant before menstruation has been established or even after the menopause. They may also become pregnant while nursing.

A nurse is so often questioned on these points that it

is well for her to have information concerning them. Always endeavoring to discourage the inquisitiveness of mere prurient curiosity, she should aim to give wise counsel concerning matters of which her patient may hesitate to speak to her physician. In doing so the nurse should, however, speak to the physician of any matters of importance concerning the condition of the patient which she may thus learn, and ask his counsel as to the advice she should give.

CHAPTER XIV.

DISEASES OF WOMEN.

By this term is meant, in particular, the diseases affecting the organs peculiar to women, as the external and internal genitals. The term may be made to include diseases of the rectum and bladder, which are closely associated with these organs, and also diseases of the breasts.

In investigating the *causes* of pelvic disease, we find that ignorance on the part of women is largely responsible for their great number and frequency of occurrence. Civilization, so called, has laid certain restrictions on healthful living, and established fashions which are directly opposed to physiological laws, and which tend to produce abnormal conditions.

Some of the most common causes of pelvic diseases are—

1. Neglect of physical exercise, especially in the open air.
2. Improper clothing.
3. Improper and insufficient food.
4. Habitual neglect of the functions of the bowels and bladder.
5. Imprudence during menstruation.

6. Overstrain of the nervous system by too much excitement, unwholesome reading, unwholesome companions, unwholesome thought.

7. Marriage when disease of the genital organs exists.

8. Lack of prudence in the marital relations.

9. Prevention of conception.

10. Induction of abortion.

11. Neglect of injuries due to parturition or childbirth.

Within recent years it has become more customary for women to take *physical exercise*: girls may play tennis and golf, row, ride on horseback, and take long walks without being regarded as unladylike.

Even yet, however, so much of woman's work lies within the walls of her home that she is apt to become careless on this point, to lose all taste for out-door exercise, and to confine herself to heated, ill ventilated rooms. For amusement she takes up reading, music, drawing, or some other light task, which keeps her sitting, so that her muscular system becomes weakened. It is not only bodily exertion, however, that she needs, but the exhilarating effect of sunlight and fresh air—the mental relaxation which comes from out-door exercise. Every healthy woman should walk at least two miles daily and observe the manner of walking which will serve to exercise her muscles to their fullest extent and thus stimulate the circulation—a brisk walk with head held erect and the shoulders thrown well back, so that

the lungs may, at the same time, be well filled with air. The use of the bicycle is valuable as an exercise, and is not injurious to women when judiciously used, provided there is no existing condition of pelvic disease or uterine displacement. A gynæcologist should always be consulted regarding its use when the pelvic organs are probably not in a perfectly healthy condition. So important is it to keep the general circulation in good condition that, in the management of conditions of local congestion or inflammation which interfere with active exercise, the use of passive motion by the Swedish movement cure, massage, Turkish baths, or frequent salt baths combined with calisthenics are much resorted to in treatment.

In the **style of clothing** worn by women the last few years have made a great change. It is no longer necessary for a woman to dress injuriously to health in order to be well dressed. The patterns of the various dress-reform systems aim to correct former unhygienic requirements. The constriction of the chest caused by the use of corsets; pressure and partial paralysis of the abdominal and chest muscles by tight and heavy clothing; the unnatural position of the pelvic organs as a result of such pressure were the inevitable result of former fashionable modes of dressing. To a certain extent these deleterious styles still prevail, and women who are ignorant of physiological laws, by adopting such fashions, keep them up. Intelligent women who desire to live long and happily, and to provide a future

of physical comfort for their children, are ready to adopt the reform systems which correct these errors.

The clothing should all be supported from the shoulders, and should be so constructed as to allow perfect freedom of every part of the body. The use of such a waist as is shown in figure 46, known as the Equipoise waist, to which the skirts and under-garments may all be fastened, is an excellent method of obtaining this purpose. Other patterns for waists having a similar

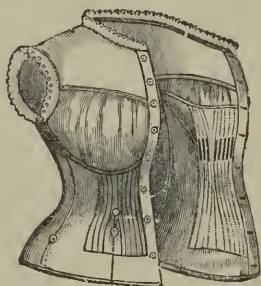


FIG. 46.—EQUIPOISE WAIST.

object may be employed. The jersey-fitting union under-garment of silk or merino may be worn in addition, if desired. Divided skirts or leglettes made of muslin, or, in winter, of flannel, cashmere, or silk, etc., make a very comfortable under-garment and enable one to dispense with under-skirts. The skirts of dresses may be fastened, by means of buttonholes in the waist-band, to the Equipoise waist or model bodice. If heavy,

however, it is best to have them fastened to a separate waist, modeled after the pattern of the child's petticoat waist with armholes. Were these methods more strictly observed in the dressing of growing girls, fewer women would be found suffering from displacements of the uterus and ovaries and the many pelvic diseases which follow in their wake. In speaking of hygienic dressing for women, it is important to refer also to the proper dressing of the feet. High-heeled shoes favor the production of uterine displacements, and thin soles are often a direct cause of colds and inflammatory affections.

Poor blood as a result of *poor eating* is so common an accompaniment of uterine disease that we must often regard it as the chief cause of an abnormal condition. The muscular tone of the pelvic organs is decidedly affected by want of sufficient nutrient material, and displacements are thus readily produced. It is not only important that a certain amount of food shall be taken daily, but the food should be such as is capable of making blood of good quality. It should be nourishing and digestible. Pastry and sweets should be avoided or taken only in small amount. The meals should be so regulated that a heavy meal shall not be taken at night, when the digestive processes are least active. Milk, eggs, meat, bread, fresh vegetables, and fruit should be properly combined in forming a wholesome dietary.

Habitual constipation and **lack of attention to the bladder** are frequent causes of uterine displacement. The

uterus lying, as it does, between the bladder and bowel, is readily affected by the condition of either. Not realizing this, women are often led, from motives of modesty, to neglect attending to their demands, and thus they acquire a habit of toleration which is most injurious. The large, hard masses of fecal matter, which remain not only for days, but often for a week at a time, in the rectum, interfere with the circulation in the pelvic organs, and produce displacements which are sometimes most unmanageable—in fact, incurable. A full bladder acts similarly by pressure on the anterior surface of the uterus, and, in addition, the retention of urine may become a source of disease both of the bladder and of the kidneys.

Violent or excessive physical exercise is to be avoided during menstruation, because of the congested condition of the pelvic organs at this time. For the same reason precaution should be taken regarding undue exposure to cold or sudden chilling from imprudence in bathing. The suppression which is often thus induced is a result of overcongestion and a direct cause of uterine and ovarian disease. *Excessive emotion* frequently produces similar results. Hence scenes of excitement should be avoided at menstrual periods. *Exposure*, due to insufficient clothing (the low neck and bare arms of fashionable evening dress), has frequently been the cause of life-long ill health.

Tension upon the nervous system is partly the result of our fast modes of living—the competition of the

day, which makes each one strive to surpass his neighbor. It is also largely the result of inheritance, education, and habit. This unfortunate combination of circumstances offers a formidable resistance to one's efforts to gain self-control. Determination and continued effort, however, accomplish much in the formation of habits which give one a capacity for endurance. The diversion of the mind into wholesome trains of thought and study will serve to hold in abeyance the impulses of one's nature. Sources of excitement, such as persistent novel-reading, a frequenting of places of amusement, extreme indulgence in society gatherings, are to be avoided.

One of the greatest difficulties a nurse will meet will be the management of a mind thus diseased, and infinite tact and skill will be necessary to enable her to steer the thoughts and purposes of her patient into safe channels. The nurse must make the *moral atmosphere* of the sick-room.

Marriage when disease of the genital organs exists is another frequent source of disease. The reason for this may clearly be seen. Organs already the seat of a morbid process are only more extensively irritated by the increased congestion thus induced.

Lack of prudence in the *marital relations* in a similar way may cause disease. Periods during which the pelvic organs are in a state of congestion, from natural or abnormal causes, should be periods of rest. Thus, during the menstrual period and for a short time before

and after the same, during pregnancy and the lying-in, the pelvic organs demand rest.

Prevention of conception and induction of abortion act in the same way as the last two causes mentioned—that is, they result in conditions of excessive congestion and even active inflammation, which not only bring about diseased conditions which cause much suffering, but which endanger the life of the patient. Blood-poisoning is not an uncommon result of efforts at inducing abortion.

Neglect of injuries due to childbirth is a most common cause of disease. Lacerations, erosions, etc., frequently pass unnoticed by the physician. The nurse, in cleansing her patient after delivery, has an opportunity to observe them, and should be careful to call the attention of the physician to their existence. This should always be done elsewhere than in the presence of the patient. The best time to repair these injuries is as soon as possible after their occurrence. Should their repair for various reasons be put off for a time, they should not be forgotten, but the advice of a competent physician obtained as to the probability of their inducing chronic forms of pelvic disease.

CHAPTER XV.

GENERAL NURSING IN PELVIC DISEASES.

From what has been said in the preceding chapter, it will be seen that it is seldom that a nurse will be called upon to take charge of a case of pelvic trouble that she will not find the patient suffering from many morbid conditions. She will have poor blood, poor circulation, poor appetite, poor digestion, poor nerves. She will suffer from cold hands and feet, indigestion, constipation, headache, backache, sleeplessness, and extreme nervousness. The nurse will have abundant opportunity to exercise all that ingenuity and skill can devise to meet this array of ills.

The physician's directions will include—

1. Attention to diet.
2. Stimulation of the circulation and respiration by bathing, exercise, etc.
3. Regulation of the sleep.
4. Regulation of the functions of the body.
5. Regulation of the clothing.
6. Treatment of local conditions of disease.
7. Mental occupation.

Diet.—The patient will probably be placed upon forced feeding—that is, she will be made to take a

certain amount of nourishment in the twenty-four hours. The food will be prescribed by the physician according to the especial requirements in each case. The milk diet is frequently used when digestion and assimilation are poor. Beef-tea is sometimes used, alternating with milk; a gill or a gill and a half of each may be given once in two hours. It may be necessary to have these peptonized. Should the liquid milk diet tend to produce flatulency, it may be of advantage to thicken the milk with rice-flour, wheat-flour, crumbled bread, etc.; junket, or milk thickened with rennet, is often liked by many patients, and is easily digested; farina, wheat-germ, egg-custard, and similar preparations, if well prepared, may be quite readily digested and help to relieve the monotony. The chief objection to the milk diet arises from its monotony; the patient gets to dislike it so that it is almost impossible to get her to take sufficient nourishment. By a little management the nurse can put off this period. A drop of black coffee or extract of vanilla in a glass of milk, or a little salt, will so change the flavor as to make it more palatable. The addition of lime-water, a tablespoonful or two in a glass of milk ($1\frac{1}{2}$ gills), is sometimes necessary to aid the digestion. Junkets, custards, and foods prepared with milk, as farina and corn-starch, also give a change and are easily digested.

When the patient does not need to be kept on liquid food, or when the dietary may be increased, fresh animal food may be given three times a day, and as much other nutritious food as the patient can take—stale bread,

pulled bread, Zwiebach, rice, eggs, crushed wheat, etc. Between breakfast and dinner, dinner and supper, and on retiring at night, the patient should take a tumblerful of milk or a cup of beef-tea, or of beef-, mutton-, or chicken-broth.

Should the patient be entirely on liquid diet, she should receive nourishment about once in three hours through the night.

A very anemic patient may need to be fed once or twice through the night, even when taking a mixed diet.

When meats are not well digested, it has been found, in our experience, that the raw-beef sandwich, made by scraping a tender piece of raw beefsteak with a knife, salting and spreading the pulp thus obtained between thin slices of bread or toast, offers a convenient and palatable form of administering animal food. Beef being the most nutritious of the animal foods, a tender piece of broiled beefsteak, or a slice or two of rare roast beef, or the raw-beef sandwich, should frequently form a part of the meal. All fried foods, pastry, and sweet desserts should be avoided. When the stomach is very irritable, and only small quantities of food can be taken, freshly expressed beef-juice gives a highly concentrated and nutritious food, one tablespoonful of this representing the nutritive properties of about one-quarter of a pound of beef. It must be remembered that the amount of food taken by a patient must correspond to the amount that she can assimilate. If the digestive organs are disordered, the quantity they can manage may be small;

it should therefore be judiciously chosen, being concentrated and highly nourishing.

Bathing.—A sponge-bath of warm water strongly impregnated with salt should be taken each morning on rising, and, if possible, at night on retiring. A teacupful of ordinary table-salt may be added to the basin of warm water. Rock-salt may be obtained for bathing purposes, and kept on hand if preferred. This sponging should be followed by a brisk rubbing with a coarse towel: the knitted tape-towel is the best, or a bathing glove made of coarse material or a flesh-brush may be used.

Calisthenic exercises with dumb-bells, rods, etc., or the practice of Swedish movements from ten to fifteen minutes following each bath, are of great value.

Any *active exercise* to be taken by the patient must be controlled by the physician. If the patient is unable to take such, the use of *massage* and *tonic electricity* must be brought into play. A good nurse should understand the methods of applying both massage and electricity for their tonic effect. Neither should be given within two hours of a full meal, either before or after. Neither should be given when the patient is very tired, nor should the application be made to exhaustion. An hour's massage is the average length of time for a patient who has learned to take it without growing tired. The application of electricity—that is, by means of the faradic battery—will require from twenty minutes to half an hour for the entire body. The patient should be

kept well protected from exposure during these applications.

A patient who is entirely dependent upon *passive exercise* and who is not too weak, may have one of these applications in the morning and the other in the afternoon or at bed-time. When the patient suffers from sleeplessness, the massage given at bed-time has often a most calming and healthful effect, serving to induce sleep. In any case, at whatever time of day these applications may be given, the patient should remain quietly at rest in bed for half an hour to an hour after the treatment, and, if possible, take a nap.

Sleep.—A patient in this generally run-down condition demands a great deal of sleep, and should try to obtain at least nine hours every night, besides the hour in the day-time. The habit of retiring early should be cultivated, as sleep is far more refreshing when thus taken in the early hours of the night. The patient should be asleep at least by nine o'clock. She will then be prepared for early rising and the enjoyment of the hours of the day which are most invigorating.

Clothing.—Something of what is required in this connection has already been stated in the preceding chapter. The clothing should be loose, light, and supported from the shoulders. It should also be sufficiently warm to aid at keeping up the warmth of the surface of the body. Sudden changes in the atmosphere should be provided for, and additional clothing employed to protect from chilling.

Remedies prescribed by the physician should be carefully given and their effect upon the functions of the body observed and noted.

The bowels should be thoroughly evacuated once in twenty-four hours. If this is not a free movement, or if its passage is attended with difficulty, bringing about straining, the matter should be reported. The use of some saline water, as Hunyadi Janos, a half-tumblerful once or twice daily, and the proper use of massage over the abdomen in the daily treatment may bring about a permanent cure of this trouble. The color and consistency of the movements should be likewise observed.

The quantity of urine passed in twenty-four hours should be noted. The usual amount in health is between forty and fifty fluid ounces. It may rise as high as eighty fluid ounces. The variation depends greatly upon the amount of fluid taken. The urine may be scanty when the patient has abstained from liquids, or when water has been eliminated in excess by skin or bowels. Thus, free sweats or a persistent diarrhœa will greatly affect the quantity of urine passed in one day. Any diminution of the urine which approaches suppression is of grave import and should be promptly reported. Temporary excess in the flow of urine will occur after hysterical paroxysms and other convulsive attacks. The color, quantity, reaction, and presence or absence of sediment should be noted.

Any disturbance of the digestion must be carefully reported to the physician, as it is exceedingly important

that digestion and assimilation should do their part to restore the broken-down system.

Vaginal Injections.—The treatment of conditions of disease of the pelvic organs very frequently calls for the use of vaginal injections.

Various methods have been suggested for giving these, and several different forms of vaginal syringe

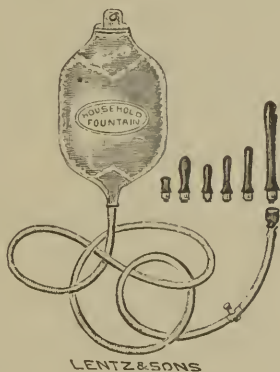


FIG. 47.—FOUNTAIN SYRINGE.

have been invented. The Davidson hand-ball syringe, or the Davidson fountain syringe are frequently employed. The method as described by Emmet, who was the first gynæcologist in this country to employ such douches extensively in his practice, is as follows:

“The injection can be better given to the patient after she is undressed for the night, and in bed. She should be placed near the edge of the bed with the hips elevated

as much as possible by the bed-pan, and a small pillow under her back, the lower limbs being flexed.

“Her body must be covered to protect her from cold and her position made perfectly comfortable; whenever the bed is a soft one, for the purpose of keeping the hips elevated a broad board should be placed under the pan to prevent it from sinking into the bed from the weight of the patient. The vessel of hot water is placed on a chair by the bedside, and the nurse passes the nozzle of the syringe into the vagina, over the perineum, directing it along the rectovaginal wall—that is, the posterior wall of the vagina—until it reaches the posterior cul-de-sac (the portion of the vagina back of the neck of the womb).

“The water must be thrown in at first very carefully, until the vagina has become distended.”

In place of the interrupted stream used by working the hand-ball syringe, as described in this method, the fountain syringe, the reservoir of which should be hung several feet above the patient's head, may be employed to even greater advantage, as it permits a continuous stream to flow into the vagina, and does away with the danger of the introduction of air or the forcible injection of water into the uterine cavity in cases where the uterine os has been torn. A patient able to be about can give herself such an injection, when without a nurse, by lying in the bath-tub while taking it, or she may place some protective on the floor and lie down upon it, with her hips resting upon a cushion or pillow, and her

lower limbs flexed. A large wash-basin can then be slipped closely up against the pillow so that the hips project over the basin. The douche having previously been prepared and the douche-bag hung at a convenient height above the surface upon which the patient lies, the stream is started by the patient opening the spring clamping the rubber tube, after which the nozzle is carried through the vaginal orifice and about two-thirds of the way up the vaginal canal—the nozzle being carried in along the posterior vaginal wall. The upper part of the vagina and the neck of the uterus thus receive free irrigation.

An inclined plane made of a board may be fitted into a bath-tub in such a way that the patient may lie upon it to receive her douche, instead of upon the floor of the tub.

When much pelvic inflammation exists, accompanied by inflammatory exudate, some gynæcologists employ frequent *irrigation* of the pelvis by large quantities of warm water, for a pronounced effect upon the pelvic circulation, by means of which the exudate may be softened and reabsorbed. The following apparatus will, in such cases, be more convenient than the douche-bag of rubber: A large copper kettle holding several gallons of water may be obtained, having a spigot with rubber tubing connected with the lower part of it. This is filled with hot water of the proper temperature, and placed on a high stand or on a stool or box placed on a table at the head of the patient's bed.

The patient lies in bed upon a rubber bed-pan with inflated border and outlet-tubing as shown in the cut. A board should be placed under the mattress to obtain a firmer surface for the support of the bed-pan if the bed be too yielding. The bedding beneath should be protected by means of a piece of rubber cloth. This may be long enough to drape down over the edge of the bed and be spread out upon the floor, the waste-bucket being placed on it. The patient

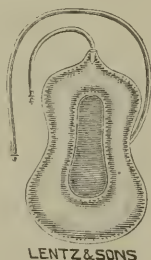


FIG. 48.—RUBBER BED-PAN.

lies with the bed-pan adjusted under her, a pillow placed beneath her back to give it support. The vaginal nozzle attached to the tubing properly adjusted, the spigot connected with the douche-can is turned; a little water is allowed to flow through the tubing into the bed-pan before the insertion of the nozzle into the vagina. The return flow passes into the rubber pan and through an outlet-tubing into the waste-bucket. A Davidson syringe may be connected with the outlet of the pan in

place of the tubing, and compression of its bulb will start the flow into the waste-bucket.

Various forms of syringe have been devised which are intended to enable the patient to do without a bed-pan. The great difficulty consists in finding a contrivance which can be so exactly fitted to the parts as to prevent the return flow from escaping over the surface upon which the patient lies. The nozzle of a vaginal syringe should have no opening at its extremity, but should be made so that a reverse, rather than a direct, current may be obtained.

Where vaginal injections are intended for medicinal

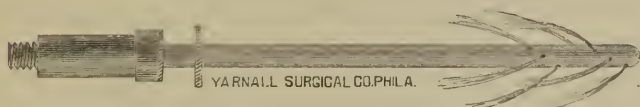


FIG. 49.—VAGINAL NOZZLE WITH REVERSE CURRENT.

effect, it is best that they should be taken lying down. In no other way can the water be carried so effectually to the diseased parts. When required only for cleanliness, they may be administered in the upright posture, the patient being seated over a vessel. A convenient method is that of placing in a tub the water to be used—one or two gallons. The patient may seat herself over this on a board placed across it, or upon a stool placed in it, and inject the water by means of a hand-ball syringe. The long nozzle being used, the water may

be thus made to bathe the cervix. When pessaries are worn, a daily cleansing injection is essential.

The Tampon.—Many pelvic maladies are treated by the use of a tampon, or pledget of cotton or wool saturated or anointed with some medicinal agent. These may be placed by the physician daily, or two or three times weekly. It will be the nurse's duty to have these tampons in readiness. They may be made by cutting strips in the length of a lap of cotton or wool, from six to eight inches long, doubling these strips and tying a piece of twine about six inches in length to one extremity. If made across the lap, the tampon will pull to pieces when an effort is made to withdraw it.

Before the tampons are placed, the vagina should be cleansed by an antiseptic injection, as bichloride of mercury 1 : 4000. As the medicinal applications used have frequently the effect of increasing the mucous discharge from the vagina, a napkin should be worn after these treatments. The cotton should be removed, at the time appointed by the physician, by drawing upon the string. It should be wrapped in a piece of paper and burned, or thrown down a privy-vault—never in a water-closet, as it will cause stoppage of the waste-pipes. The patient should then receive a thorough vaginal injection.

Pessaries.—Should the patient have a pessary adjusted,—that is, a support for the displaced uterus,—the nurse should not permit her to move about if it causes her pain—at least, until the physician acquiesces in her doing so. A properly adjusted pessary should cause no dis-

comfort. Any complaint of pain or increase of vaginal discharge from its pressure should be reported to the physician. A patient should understand fully that it is unsafe to wear such a support without the supervision of a physician, who shall advise her as to the necessity of having it removed from time to time for cleansing and replacement or entire removal.

Counter-irritation over the lower part of the abdomen may occasionally be called for in the form of blisters, ointments, poultices, etc. In the management of these the nurse should follow the ordinary rules for their application elsewhere. Poultices of flaxseed, or hot packs, should, if required for warmth, be applied frequently enough to keep up warmth (about once in two hours). *Hot packs* consist of pieces of flannel or several layers of soft muslin wrung out of boiling water, to which a little glycerine may or may not be added. These are applied as a poultice, being covered by a piece of oiled silk or muslin, and, to still more effectually prevent evaporation, by a layer of cotton-wool. An abdominal binder, held in place by a perineal bandage or an ordinary T-bandage, will serve to keep these applications in place.

Ointments are best applied on patent lint or soft Canton flannel. They should be spread the thickness of a knife-blade. The best means of keeping such applications in place is by strips of rubber adhesive plaster. A piece of oiled silk or cotton-batting should be applied over this to prevent the greasing of the clothing.

A *blister* should be carefully watched and removed as soon as the scarf-skin fills up with liquid beneath it. If it seems slow in rising, as it should in five or six hours, a flaxseed poultice applied over it will hasten the process. In dressing the blister care should be taken not to remove the scarf-skin. Clip a small opening in the most dependent part of the blister, soak the liquid up by absorbent cotton or soft rags, and dress the blistered surface with some bland antiseptic ointment, as borated zinc ointment, applied on lint. The fluid from the blister should not be allowed to run over the skin elsewhere, as it will produce irritation.

Mental Occupation.—The more entirely a nervous patient's mind can be kept occupied with other things than herself, the more successfully may she be treated. Upon the nurse will devolve the duty of supplying wholesome for unwholesome thoughts. For this reason, if none other, the nurse should keep up, as far as possible, a knowledge of the events of the day. She should be able to talk to her patient about the world and its doings, and thus help to widen the horizon and prevent the fret and worry which result from a persistent contemplation of small woes. All gossip should be carefully avoided. It is necessary that the nurse should be a good reader, and should train herself to read aloud, for she may in this way while away many a weary hour which might otherwise be spent in profitless thought. An additional recreation for younger patients particularly are some of the card games, or puzzles, etc.,

which are interesting because of the incentive they give to thought.

With infinite *tact* a patient may be thus led, without knowing it, into a more wholesome mental atmosphere than that which she has been accustomed to breathe. The effect upon her general health when this state of things can be obtained will be marvelous. The nurse will need to remember that each patient offers her a new problem, and that she must not attempt the same methods with all.

CHAPTER XVI.

PREPARATIONS FOR GYNÆCOLOGICAL EXAMINATIONS.

The nurse is frequently called upon to aid the physician in obtaining a satisfactory **history** of a patient suspected of having pelvic trouble. The following plan is that generally adopted:

1. A short sketch of the family history; health of parents, brothers, and sisters; if any deaths among them, their cause. These facts are of importance as showing a predisposition to any especial class of diseases.

2. The personal history of the patient, her health in childhood, the diseases from which she may then have suffered. Date of first menstruation, character as to existence of pain at periods, amount of flow, regularity, etc. Date of marriage, number of pregnancies, number of miscarriages, number of labors, character of labors, character of convalescence. General health during marriage or since puberty.

3. History of the special disease from which the patient may be suffering; its onset, duration, character of symptoms, supposed cause, etc.

4. Present state of health, general appearance, character of functions, appetite, digestion, quantity of urine

passed in twenty-four hours; the urinalysis. Examination of chest organs, abdominal organs, and pelvic organs (determined by physician).

5. Special examination with reference to tumor or existing disease.

Physical Examination.—The physical examination of the pelvic organs is much better conducted upon a table covered with a blanket, rug, or comfortable, and provided with a small pillow, than it can possibly be upon a bed or sofa. In this way one avoids the sinking of the body into the soft bed, and affords other facilities for a thorough investigation of the diseased parts. A sheet or blanket for covering the patient gives the desired protection from exposure.

When it is necessary to employ a bed, a sewing-board or the leaf of a dining-table slipped under the upper sheet and covering gives a hard surface upon which the patient may lie.

The patient's clothing should be loose around the waist, all the waistbands being unbuttoned or untied, corsets removed, and all heavy skirts. She should lie on her back in the first examination, unless directed otherwise by the physician. If the abdomen is to be examined first, the patient's feet may be placed on a chair or stand; as she lies on the table, the knees should be well drawn up so that the abdominal walls may be relaxed. A sheet should be spread over the lower limbs, the loosened skirts being either drawn down under it or thrown back over the chest, in order to expose the ab-

domen. The sheet may be drawn up over the abdomen, after the clothing has been adjusted for examination, until the physician is ready to proceed to its inspection. The table should have been previously adjusted in front of a window admitting a strong light. At the foot of the table should be placed a chair for the physician, and to its right a stand or chair with a basin of warm water and one containing some antiseptic solution, as bichloride of mercury 1 : 1000, soap, a towel, and a jar of carbolized vaseline.

When the pelvic examination is to be made, the limbs must be drawn up and separated, the feet resting on a level with the patient's buttocks. The patient's skirts are pushed up beneath the sheet until they rest over the abdomen ; the sheet covers completely the lower limbs, pelvis, and abdomen.

A variety of gynæcological tables and chairs exist. The nurse will have to be taught the management of any especial kind by the physician in whose office or hospital she may be called upon to work. In a private house an ordinary kitchen-table serves the purpose very well. The chief advantage of the special tables consists in the foot-rests, which are so adjusted as to let the patient's hips be brought well to the edge of the table, thus facilitating the use of the speculum.

Should the patient be extremely nervous, or the investigation involve much pain, it may be necessary for an anæsthetic to be given. This can only be done with safety if the patient's stomach be empty. Therefore, it

is well for the patient not to have taken any food for some hours before the examination. The lower bowel should have been thoroughly emptied by an enema prior to the examination, and the patient should be required to void her urine. The condition of both these



FIG. 50.—CHADWICK'S GYNÆCOLOGICAL TABLE WITH PATIENT ARRANGED FOR EXAMINATION.

organs has much to do with success in an examination. It may be necessary, should there be difficulty in the voiding of urine, to use the catheter for the patient prior to the examination. This should always be done immediately after etherization, when the patient

requires to be anæsthetized, as the taking of ether, which usually causes considerable nervous excitement, is apt to lead to an excessive secretion. When an abdominal or pelvic tumor of any size exists, the soft-rubber catheter, English or French, should be used, as there is less danger of injuring the urethra by its use. The silver or glass catheter might do injury to the tissues, because of its inability to adapt itself to the changes in the direction of the canal.

The instruments to be used by the physician in the course of the examination must be prepared and handed to him by the nurse.

These will be different forms of specula, as the bi-



FIG. 51.—THE UTERINE SOUND.

valve, the cylindrical, and single-blade speculum; the uterine dressing forceps, applicators, and possibly the uterine sound.

There are many varieties of *specula* named for their respective inventors. The following illustrations show the special characteristics of the different forms of instruments. The *bivalve speculum*, so called because of its having two blades, is usually employed for the examination of the uterine cervix and for the applications of medicaments and the introduction of tampons into the vagina. The *cylindrical speculum*, made of clear glass,

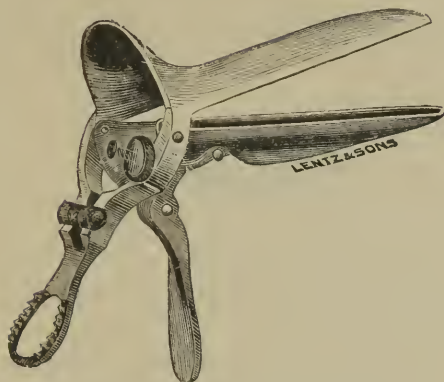


FIG. 52.—BIVALVE SPECULUM.



FIG. 53.—VIRGINAL BIVALVE SPECULUM.

or glass silvered and covered with black varnish, so that it will act as a reflector, is an instrument of especial value in making applications to the vaginal walls.

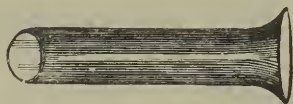


FIG. 54.—CYLINDRICAL SPECULUM.

The cylindrical speculum may also be made of celluloid or hard rubber.

The *single-blade speculum*, sometimes called the duck-bill speculum, or Sims' speculum, of which there are many modifications, is most employed in *operative work*

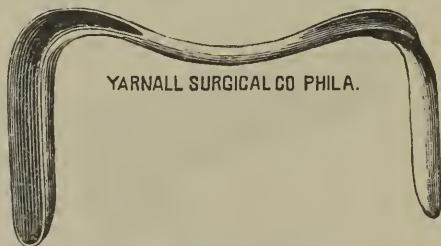


FIG. 55.—SIMS' SPECULUM (DUCK-BILL).

upon the upper part of the vagina and neck of the uterus for exposure of the parts to view. Edebohl's speculum is a duck-bill speculum with a detachable two-pound weight, which is hooked to the blade for the purpose of

keeping the perineum retracted. This does away with the necessity for retraction by an assistant during an operation.

Metallic specula are nickel-plated, as a rule. Aluminium specula are not nickel-plated. They are light in weight, hence easily carried; and have, further, the advantage of not tarnishing or corroding when they come in contact with the chemical substances ordinarily used in making uterine applications. Bichloride of mercury will, however, corrode aluminium; hence solutions of bichloride will need to be avoided in using this, as other metallic instruments. Aluminium is also affected by soda; therefore such instruments should be sterilized by boiling in plain water.

Nickel-plated instruments should not be rubbed too vigorously or too frequently with sand-soap, whiting, etc., as the nickel wears off. The boiling or steaming of such instruments is the better way of cleansing them after thoroughly washing them with soap and water. Too much care can not be given to the *cleansing of instruments* after use, because of the danger of the carrying of infection from one patient to another where this precaution is not taken. Patients suffering from venereal diseases, as syphilis or gonorrhœa, should, especially in hospital practice, have set aside for them special instruments, which should always be separately cleansed. Further directions concerning the cleansing of instruments are given later.

The *dressing forceps* and *sounds* are usually of metal

(steel, nickel-plated), although the flexible sound may consist of rubber. *Applicators*—that is, small rods for the carrying of cotton charged with some medicament to the neck or body of the uterus—may be of metal, rubber, or wood. A very convenient and inexpensive applicator for hospital use is the wooden splint, about six inches long, which represents one stage in the process of the preparation of matches. These may be obtained in large quantities at match-factories, and kept with a little cotton twisted on one end for use as desired.

The instruments as required for use by the examining



FIG. 56.—DRESSING FORCEPS.

physician should be taken from a warm sterile solution in which they have previously been placed; lubricated, if specula, with a little carbolized vaseline if desired by the operator, in order that they may slip without resistance into the vagina, rectum, or urethra, and handed thus to the physician. After the speculum has been placed, the nurse will need to hand the dressing forceps, between the extremities of which a little dry absorbent cotton may be held. This will be needed to cleanse the passage of any discharge which may obscure the view.

Such pieces of cotton, previously sterilized, should be kept in readiness by the nurse, being placed as small twists or balls in a glass or china vessel within reach of the examiner, should more than one be required. Sterilized tampons should similarly be kept in readiness in glass jars.

A waste-bucket or bowl should be placed beneath the foot of the table to receive waste-matter.

Should the physician desire to make an application to the parts brought to view, the nurse may moisten the cotton on an applicator in a small quantity of the medicament specified by him, which should be poured out into a china or glass vessel kept for the purpose. The cotton should not be saturated with the substance, as it may then drip over the tissues where not desired and produce unpleasant effects.

Should a tampon need to be placed, this should similarly be prepared by the nurse, caught between the blades of the dressing forceps, and handed to the physician. Care should be taken that the nurse's hands are prepared for this work. If handling other things, she should not touch the instruments or dressings, but simply see them conveniently placed for the physician's use.

Upon the removal of the speculum, and after having assisted the patient to alight from the table and dress, the nurse should give her attention to a thorough *cleansing of the instruments* used, particularly if they are to be immediately employed for another case.

They should be placed in warm water and scrubbed with nail-brush and soap. Should there be a steam sterilizer in operation in the room, they may then be dropped into it until needed for the next patient. Ten minutes will suffice for their sterilization when the steam is at its height. In place of this a basin of boiling water over an alcohol-lamp or Bunsen burner may be kept ready for use in the office, and after the soap and water cleansing, the instruments dropped into it until needed for the next case. Office sterilizers are used by many physicians.

Positions.—Another duty of the nurse in attendance upon a physician making examinations will be to place the patient in the positions desired. These positions are known as follows:

The *lithotomy position* is the ordinary recumbent position, the limbs being markedly flexed upon the abdomen. This is usually called for in operative procedures upon the pelvic organs. The method of maintaining it by the leg-straps will be described later.

The *Sims position*, for bringing the uterine cervix within easy access, and for making rectal examinations. The patient lies on her left side, with her left arm drawn behind her, so as to let her rest on the left side of her chest. The right leg should be so flexed as to let the right knee lie just above the left. This position is necessary for the use of Sims' speculum. The patient's clothing being well drawn up under her hips and a sheet thrown over the lower extremities for their protection,

the physician introduces Sims' speculum, which the nurse holds in place with one hand, while with the other she lifts the right buttock to aid in the exposure of the vulvar orifice and vagina.

The *genu-pectoral* or *knee-chest* position is one which is frequently assumed for the replacement of the pelvic organs or the appreciation of their mobility.



FIG. 57.—SIMS POSITION.

This is obtained by having the patient place herself upon her knees and bend forward so that her chest may rest on a pillow placed upon the bed or table, her head resting beyond the pillow on one side or the other. The arms should be placed in an extended position at her side or may be clasped around the sides of the table, so that she may not be tempted to rest upon her elbows. This brings the hips to a level considerably above the

head, and enables the abdominal and pelvic organs to gravitate toward the diaphragm. The patient's clothing should be pushed back from under her knees and lifted above her hips, the sheet being draped over her for the protection of the parts thus uncovered. A separation of

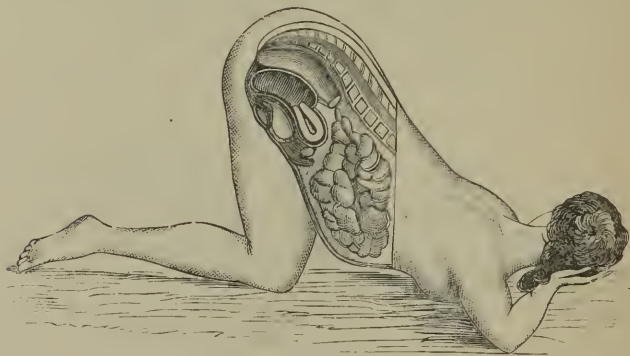


FIG. 58.—GENU-PECTORAL POSITION.

the buttocks by the hands will allow of the entrance of air into the vagina, which will serve to force the pelvic organs forward.

In cases of displacement of the uterus, the nurse may be called upon to assist the patient to take this position several times daily.

CHAPTER XVII.

PREPARATIONS FOR GYNÆCOLOGICAL OPERATIONS.

The divisions of this subject may be classified as follows :

1. Preparation of the room.
2. Preparation of the sponges, instruments, etc.
3. Preparation of the patient.
4. Preparation of operator and assistants.
5. Nurse's duty during operation and convalescence.

Preparation of the Room.—Excepting for vaginal hysterectomy (removal of the uterus through the vagina), which is to be regarded as a major operation, it will not be necessary to remove carpets, furniture, etc., from a room which is clean and thoroughly well kept. It is well, however, in any operation, to have special provision made for the *protection of the floor*.

Prior to the operation the room should be thoroughly swept and dusted, and well aired. Superfluous furniture and hangings, because they interfere with ventilation, it is always desirable to remove. All operations are better done on *a table* than on the bed. Therefore one should be prepared by the nurse. As in operations on the pelvic organs, the patient will have to lie with her hips close to the edge of the table, the knees being drawn

up. One table, of the ordinary size of a kitchen-table, will be sufficient, without the table placed transversely to this for the head, as in abdominal section.

The table should be placed before a window, so that there may be thoroughly good light. Some protective, as a piece of oil-cloth or drugget, should be spread upon it as well as under it. The arrangement of the dressings for the table should be the same as described for abdominal section—a blanket or comfortable spread over the table and tacked down round the edges. A piece of rubber should protect this covering, at least over the lower half of the table, when the operating-pad is not used. A sheet should be spread over these and similarly fastened down at the sides. A blanket and sheet for covering the patient, and a pillow protected with rubber cloth fastened around it, under the slip, should be arranged on the table. A chair should be placed at the foot of the table for the operator.

The stand for the surgeon's instruments should be placed to his right, within easy reach. On this stand—beside the instrument trays—should also be found a tray or vessel containing a sterilized solution for him to dip his instruments into while in use, or to use in cleansing his hands, from time to time, of blood.

Two assistants usually stand one on each side of the table, to aid the operator by holding the patient's limbs in any desired position; also in aiding with instruments, ligatures, sponging, etc.

The nurse, with her table for cleansing the sponges,

should stand back of the assistant on the operator's left, handing him sponges and receiving them from him for recleansing. Her stand should contain one basin filled with cold sterilized water for washing out the blood, and another basin with warm sterilized water for keeping them in until needed.*

A chair or stool should be placed at the side of the operating table to aid the patient in stepping up. The window should be screened from the outside gaze by a thin lace or muslin curtain, or a sheet of newspaper may be pinned across it. A waste-bucket should stand under the table immediately in front of the operator. The operating-pad may be placed at the lower edge of the table, so that its flap rests over the waste-bucket and thus conducts the water used in irrigation, etc., into it.

When the operator works without a pad, it is well to have a folded sheet so placed over the lower portion of the table as to extend from beneath the patient's hips over the lap of the operator. This serves to protect his clothing, the floor at the foot of the table, etc., from soiling. Irrigation can not be so conveniently used when the pad is dispensed with. If required, a basin or bed-pan must be placed beneath the patient's hips during the irrigation.

The *bed* for the reception of the patient after operation should be arranged beforehand. It should be so

* When the operator attends to the sponging, it is usually more convenient to have the sponges on the right.

placed that access may be had to it on three sides. It should not face the light. A firm mattress, as of hair, is the most desirable. Care should be taken to see that the bed is in every way comfortable. A pad should



FIG. 59.—OPERATING-PAD.

protect the mattress, and a rubber protective should be so placed over this as to cover the portion of the bed over which the parts operated upon shall rest. In pelvic operations this will be the middle of the bed; in a breast operation, the upper part of the bed. A sheet is

spread over these, and a draw-sheet—that is, a sheet folded upon itself twice in its length—is fastened over the portion of the bed beneath which the protective has been placed.

A heated soapstone or hot-water bag should be placed, previous to the operation, between the upper and lower bed-clothes, so that the bed may be warm for the reception of the patient.

The nurse should learn before the operation the kind of *solutions* to be used, if antiseptic solutions are to be employed. Should bichloride of mercury and carbolic acid be employed, which are the usual solutions desired by surgeons, a large bottle containing a solution of 1 : 500 or 1 : 1000 of the former and another containing 1 : 20 of the latter will enable the weaker solutions to be prepared with great rapidity. Thus, if a solution of 1 : 4000 of the bichloride be called for, the nurse taking one part of the 1 : 1000 (as one gill) can add three parts (or three gills) of warm sterilized water to this, thus obtaining a warm solution of the required proportion. If a bath thermometer be kept in the basin during the admixture of the solution and the water, the nurse may, by watching the column of mercury, determine whether to make the addition from the warm or cold water, until she obtains the quantity desired.

A solution of 1 : 1000 can be prepared by mixing in equal parts the solution 1 : 500 and warm sterilized water.

A solution of 1 : 40 carbolic acid (that usually em-

ployed for the immersion of instruments) may be made by adding the same quantity of warm sterilized water to a solution of 1 : 20. Instruments are now more generally kept in a bath of sterile water or a one per cent. solution of carbonate of soda.

Sometimes surgeons prefer the use of tablets of bichloride in making up solutions. The directions as to the strength of one of these will be found upon the vial in each case. As a rule, a tablet represents $7\frac{1}{2}$ grs., which, when added to a pint of water, gives a solution of 1 : 1000. A fountain syringe containing the solution to be used should be filled and hung behind and considerably above the operator, on a nail, that it may be ready when needed. Sterile water is, as a rule, preferred for irrigation, unless foul discharges require to be dealt with.

When the operator is obliged to use the edge of a bed in place of a table, the bed should be placed with one side sufficiently near the window to obtain a good light. The sinking of the patient in the bed may be prevented by placing a board beneath the mattress and the springs, or between the mattress and pad. This portion of the bed should then be arranged for the operation in the same way that the table was arranged, as to the protective rubber and sheet.

A chair or stool of proper height with reference to the bed should be placed in front of this arrangement. The floor, for about one foot beneath the bed, on that side, and extending to at least two feet beyond it, should be protected by floor oil-cloth or old carpeting.

The *stands* and other articles required should be arranged as before described. The preparation of sponges and instruments for the operation will be identical with those described in the chapter on the subject of their preparation for abdominal section. The dressings employed will vary somewhat, being dependent upon the choice of the operator.

For operations upon the floor of the pelvis, or within the vagina, a *T-bandage* with an antiseptic pad of some kind will be necessary. The *T-bandage* will consist of a straight abdominal bandage of firm muslin, to which a strip of muslin about four inches wide is fastened at right angles, so that it may serve as a perineal band passing between the limbs and fastened before and behind to the lower end of the abdominal bandage.

A folded towel or napkin, pinned by a safety-pin to the abdominal bandage, serves the purpose very well. When a self-retaining catheter requires to be used, or when a vaginal dilator must be held in place, or clamp forceps (as in vaginal hysterectomy) must be supported, a double *T-bandage* serves the purpose better. The two strips of muslin cross over the dressings in such a way as to retain the instruments in place without undue compression.

The *pad* is usually made of sterile gauze, or one of the different kinds of antiseptic gauze.

The *Garrigues occlusion dressing* is used by some surgeons. This consists of one or more pieces of dry patent lint 6 × 8 inches, which have previously been

rendered antiseptic by saturation in a solution of bichloride of mercury 1 : 1000.

These are placed over the vulva, doubled in their width so as to make a dressing 3×8 inches. The lint is then covered by a piece of gutta-percha tissue 4×9 inches, which is wet in a 1 : 4000 solution of bichloride of mercury.

These dressings are kept in place by a napkin of sublimated cheese-cloth 18 inches square, folded to form a diagonal 5 inches in width, within whose folds a pad of oakum is enclosed. The napkin is tightly fastened to an abdominal bandage, both anteriorly and posteriorly, by means of safety-pins, and the access of air to the vagina is thus prevented. These dressings are changed as they may require, according to the amount of discharge. Should the catheter have to be used at stated intervals, fresh dressings should be employed in again protecting the parts.

The nurse can obtain the cheese-cloth at any dry-goods store, and prepare it by first thoroughly washing with soft soap and boiling and then bringing it out in a solution of bichloride of mercury 1 : 1000, and drying wrapped in a towel in an oven. The patent lint, obtained in a drug-store, may be rendered antiseptic in the same way. The gutta-percha tissue and oakum may also be obtained at a drug-store, the former more advantageously, perhaps, at a rubber store, where also a good syringe should be obtained for use in the case, if required.

Although sterile or bichloride gauze is most com-

monly used, iodoform gauze may be preferred by some surgeons. The unpleasant odor of iodoform has often led to the substitution of some other form of dressing in preference.

The *preparation of ligatures and sutures*, the *threading of needles*, etc., does not usually devolve upon the nurse, yet may be required of her. The same rules must be observed as in their preparation for abdominal operations. The needles vary much in size and shape, according to the character of the operation to be done. The surgeon, too, will have his own choice as to the kind of needle he prefers. The nurse must, therefore, learn his preference and observe it.

A sterilized towel, containing a set of dressings neatly folded, and the bandage, safety-pins (in a vessel containing alcohol), and the box of dusting-powder to be used in the dressing of the wound, should be brought to the surgeon by the nurse at the proper time for their application; hence should be kept in readiness.

CHAPTER XVIII.

PREPARATION OF THE PATIENT, OPERATOR, AND ASSISTANTS.

Preparation of the Patient.—First of all, it is important to get the patient into a good *mental condition*. She should have her thoughts, so far as possible, kept off the operation. The utmost tact will be necessary to manage this successfully.

It is well to make all the preparations for operation elsewhere than in the presence of the patient.

If the operation is to be on the pelvic organs, involving vagina, uterus, bladder, or rectum, it will be especially necessary to have a thorough evacuation of the bowels. The night before the operation a *laxative* or purgative may be given, and the morning following the lower bowel may be further cleansed by an injection of soap and water.

The patient should *not have any breakfast* on the morning of the operation. If the operation is not to be done before noon, she may receive a cup of coffee or tea or a cup of beef-tea early in the morning. Some operators allow a little solid food with this early morning meal.

The patient should remain in bed, lest she should feel faint for want of food.

A *full bath* should have been taken on the night previous to operation. She should *wear*, according to the weather, a merino or gauze vest, a pair of drawers and stockings, a long night-dress. When the vest is worn, a chemise should be dispensed with, as it is an awkward garment to remove when a change is needed, especially where the patient must be kept as quiet as possible. The *hair* should be parted in the back and plaited in two braids, one behind each ear. This is most convenient when lying upon the back, and prevents matting of hair.

A *vaginal injection* of bichloride of mercury 1:8000 or some other disinfectant will probably need to be given just before the operation. The vulva and surrounding parts will need especial preparation by a thorough cleansing, first with soap (preferably green soap) and warm water, and then with some disinfectant solutions. The hair about the vulva is often shaved up to a level with the meatus urinarius, or entrance to the bladder. The choice of the surgeon regarding the *shaving* should be learned by the nurse previous to her attempting the same. Many surgeons prefer attending to the especial preparation of the site of operation after etherization.

In private houses the anæsthetic is generally administered in an adjoining room, and the patient afterward carried in and placed upon the operating-table. The nurse aids the surgeon in carrying out these arrangements. She should learn from him in what position

the patient is desired when placed upon the table. The *dorsal position*—the patient lying upon her back with the limbs flexed—is that usually required for operations upon the vagina or the perineum. The patient's clothing in this position should be well drawn up from under the hips and pushed above the operating-pad, which is

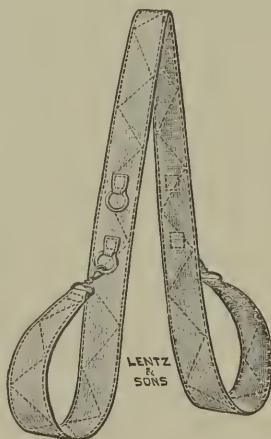


FIG. 60.—LEG-HOLDER.

then placed under her. The limbs, being flexed, may be fixed in position by the *leg-holder*, as shown in the cut, or held by assistants. The leg-holder, being thrown around the patient's neck, is fastened, just above the knee, to each limb. When there is not a sufficient number of assistants to aid in holding the limbs, and no leg-holder has been provided, one may be improvised

by twisting a widely opened sheet diagonally from corner to corner, placing the centre of the twisted sheet under the upper part of the back, carrying it under the axilla on one side and over the opposite shoulder, and fastening the ends around the lower limbs in the popliteal space. Operating-tables are frequently supplied with rods containing stirrups for the patient's feet. This contrivance takes the place of the strap leg-holder.

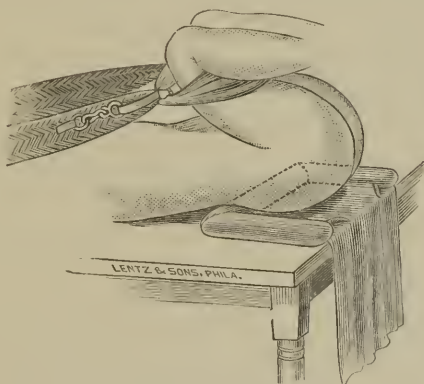


FIG. 61.—DORSAL POSITION AND ARRANGEMENT FOR OPERATIONS ON FLOOR OF PELVIS.

A sheet should be so draped over the person as to cover the limbs and protect the patient so far as possible from unnecessary exposure. Some operators use loose bags of muslin, which have been previously sterilized, for encasing the limbs during operations.

A double fold of sterilized gauze, about a yard square,

with a slit cut in it, through which the special site of operation may be exposed, is used by some surgeons as a further *protection against exposure*, being draped from beneath the sheet over the vulva and buttocks, the operator carrying on his manipulations through the opening which exposes the special site to be operated upon.

The *Sims position* is frequently used in cervical operations, for fistulæ, or for operations about the anus, as for hemorrhoids.

The knee-chest position is but seldom used for operation except in certain forms of fistulæ, as vesico-vaginal fistulæ situated in the upper part of the vagina. The patient's chest in such cases may need to be supported by a thick pillow or a padded stool, to bring her into proper position for the operator. The head should rest on one side upon a pillow.

The nurse should in every case aim to keep the patient's clothing out of the way of the operator and from contact with the discharges, but she should so adjust sheets, towels, etc., as to save the patient any unnecessary exposure.

The preparation of the operator and assistants will be practically the same as that observed in preparation for abdominal section.

Any open surface upon the patient's body may become a source of infection, therefore the requirements of asepsis and antisepsis should be as rigidly observed as possible in the preparations for any operative procedure.

CHAPTER XIX.

DUTIES OF NURSE DURING OPERATION.

The patient being placed, and the operation begun, the nurse, unless directed otherwise, will need to station herself by the stand which contains the vessels for cleansing the sponges. Several *mounted sponges* should be prepared—that is, natural sponges cut about the size of a walnut, placed on stems of metal or rubber, called sponge-holders, or small gauze pads clamped into the holders. Forceps with catches may be used when these are not on hand.

For operations in the vagina or on the cervix, etc., these mounted sponges are especially necessary.

The nurse, while attending to the sponges, can not readily respond to other demands of the surgeon—changing the water in the basins, refilling the irrigator, removing soiled towels and replacing them with fresh. When she is the only nurse in attendance on the case, she should have everything prepared and conveniently placed beforehand, so that no time may be lost in running out of the room for what is wanted, and then one of the surgeon's assistants can either attend to the sponges (which is usually preferred), or respond to any other wants of the operator. When attending to the

sponges, should she be called off for any service requiring her to touch a non-sterile article, she should cleanse and sterilize her hands.

Natural sponges should be thoroughly cleansed of blood in the basin of cold water and allowed to lie in warm water until wanted. They should be squeezed until as free of moisture as possible, and should be handed in quick succession to the assistant nearest to the nurse who will have the sponging to attend to.

At no time in any operation should the nurse allow herself to become so engrossed in watching the operation as to forget that there are duties incumbent upon her. She should give her sole attention to the performance of her own duties, and no more think of watching the operation (except as she may need to do so for the proper appreciation of the special duties that may devolve upon her at each step) than should the etherizer, whose sole attention should be engrossed in the proper performance of his work.

At the completion of the operation the nurse may assist in slipping the rubber pad from beneath the patient. It may be placed in the waste-bucket temporarily while she proceeds with a sponge and a dry sterilized towel to prepare the parts for the application of the dressings. When entirely dry, the powder, boric acid, or iodoform may be applied, if wanted, by the surgeon, and then the dressings are put in place and fastened down by a bandage. A blanket is then wrapped around the patient, and she may be lifted into the bed which

the nurse, just before the application of the dressings, should have prepared for her reception, by turning down the covers and removing temporarily the hot soapstone or water-bag. The latter may then be replaced at the patient's feet; a soft towel should be placed under the patient's head, and another towel under her chin. A light basin for the patient to vomit in, in case she is nauseated, should be placed under the head of the bed. A soap-cup can often be more conveniently used for catching vomited matter than a basin, as the patient lies in bed. A chair for the doctor should be placed beside the bed. While the doctor and his assistant give their attention to the patient, the nurse may quickly remove all the articles used during the operation.

CHAPTER XX.

SPECIAL NURSING IN GYNÆCOLOGICAL OPERATIONS.

After-care.—There will be little points of difference in the management of each case, which will depend upon the character of the operation performed. Some of the most frequent gynæcological operations will therefore be referred to separately, in order that the especial points in their nursing may be demonstrated.

After *minor operations* there is seldom the profound shock which sometimes exists after an abdominal or any other major operation. Should there be, the nurse will need to give her attention to the restoration of the patient, as has already been described in the treatment after abdominal section.

Should the nurse not be needed by the patient, the doctor or his assistants remaining for a short time with her, the nurse may quietly and quickly busy herself with removing the operating-table, soiled sheets, towels, etc., and setting the room in order. When the doctor leaves, her place is by her patient.

Surgeon's Directions.—Careful directions should be received by her as to her especial duties in each case. She should inquire of her surgeon whether the patient may be permitted to have her position changed from

time to time ; what shall be done concerning the use of the catheter ; the amount of nourishment given the patient ; the use of any medicines, etc. These facts should be carefully put down on paper and kept for her guidance in the care of the case.

Rupture of the perineum or perineal laceration is so frequent that the operation for its repair, known as the *perineal operation*, is the most common of the gynæcological operations. The extent of the laceration, which is usually the result of childbirth, varies. When it extends through the sphincter muscle of the bowel, it is called a complete rupture.

It is not only important in the repair of these injuries that the operation should be well done, but that the healing of the wound should in every way be promoted. The patient's general health should, therefore, be in a satisfactory condition, and the bowels should have received very careful attention for several days. When we remember that the intestinal canal is about twenty-five feet long, and that fecal masses are often kept stored up in it for months, we can understand how free evacuations on several successive days may be necessary before the patient is in fit condition for operation. Some laxative, as recommended by the physician in charge of the case, will be necessary during this period. The opening of the bowels twice every twenty-four hours is not too frequent. An enema will need to be administered a few hours before operation. Care should be taken not to set up a diarrhœa, as this condition may

cause greater inconvenience than constipation during the convalescence. The preparatory treatment will also include attention to hemorrhoids, if they exist, or discharges from the uterus and vagina. When hemorrhoids exist, it is well to keep them supported by a T-bandage and a compress over the anus.

Discharges from the vagina, which may interfere with healing, must be cured before the operation is undertaken. The use of hot-water injections, medicated according to the direction of the physician, and other local treatment as required will be necessary for this.

Perineal Operation.—For this operation the patient will need to be placed in the lithotomy or dorsal position. The preparations for fixing her in this position should, of course, not be undertaken until she is fully etherized and no longer in a condition to be frightened by them.

Her limbs may then be flexed upon the abdomen and held either by an assistant on each side or by the leg-holder. The clothing under her back being well pushed up, the hips are brought to the edge of the table and the operating-pad adjusted beneath them. The parts are washed thoroughly, first with tincture of green soap and water and then an antiseptic solution, and the hair on the posterior part of the vulva and the perineum shaved away or cut close, if desired. Sterilized sheets or towels are made to envelop the limbs and protect the parts, exposing simply the site of operation. A large pan or foot-tub should lie just below the parts on the floor, so as

to catch blood or the water used in irrigation. The labia are held apart by the assistants on each side. The fingers of one hand of each of the assistants can hold back these greater lips, while the other hand of each remains free to assist with sponges, holding instruments, etc. The assistants should stand so as to keep out of the operator's light. The nurse attends to cleansing and handing the sponges, or, if an assistant takes charge of this, she changes the water in the basins and responds to the other needs of the surgeon and assistants. After the completion of the operation a T-bandage with antiseptic dressings, as before described, may be applied, according to the wish of the surgeon, and the patient placed in bed. Sometimes an ice-bag is applied over the perineum for the relief of pain and prevention of any inflammatory tendency.

After-care.—For the first three days it is well to look at the wound, for the purpose of keeping it dry and clean, about once in three hours. It may simply be necessary to apply fresh dressings of sterile gauze for the purpose without irrigation. The external parts will, from time to time, require washing when there is a discharge. The washing may be accomplished by means of a stream of tepid sterile water, or some antiseptic solution from a syringe, and the parts are then carefully dried with a piece of antiseptic lint or gauze. If there is no discharge, the parts should simply be kept dry. A powder, as boric acid or iodoform, may be dusted over the site of the wound from time to time to insure this, if called for

by the surgeon. The vagina will only need to be washed out should there be a discharge, and then solutions of boric acid or corrosive sublimate are, as a rule, preferred. Great care must be taken, in the insertion of the nozzle, that no injury is done to the stitches. It should be seen that the water returns freely from the vagina. Pressing the nozzle of the syringe against the anterior wall of the vagina will be apt to leave space enough for the return current.

The *catheter* may need to be used every six or eight hours for several days, although it is better to avoid its use, letting the patient pass her water from the first. A loaded bladder makes the patient restless. There is probably little, if any, danger of urine irritating the wound. Should the urine be passed, the parts should be afterward irrigated with an antiseptic solution and thoroughly and carefully dried. The use of the catheter, unless aseptically carried out, may cause irritation of the bladder, which is often a source of great suffering.

The question of *opening the bowels* is very important, especially in cases of complete rupture. The practice of surgeons differs in this respect. Some keep the bowels locked for a week or ten days; others, however, keep the bowels free from the first, as the hard masses of fecal matter (*scybala*) which are apt to collect in the lower bowel subject the united parts to some strain.

When it is desirable to obtain an evacuation, the practice is to administer a gill of cotton-seed oil by bowel, allowing it to remain while some laxative is administered

by mouth, as a teaspoonful of castor oil every hour, until four to six doses have been taken, or the bowels feel like moving. The dose of oil may be administered in half a Seidlitz powder, flavored with a drop of oil of peppermint, or gaultheria, or a little syrup of ginger, etc. This prevents the nausea attendant usually upon taking the oil. By this method a soft evacuation of the bowels is secured, and, if the precaution be taken to have the patient lie on her side while the bowels are moved, there will be little injurious effect from strain. A thorough irrigation and cleansing and drying of the parts should follow. The use of calomel in divided doses, followed by salines, is often employed in preference to the oil. Whatever laxative is ordered, an effort should be made to secure as liquid a stool as possible. Should the patient be disturbed by *flatus* before the bowels are moved, having a bearing-down sensation with pain, an English catheter, about No. 9 or 10, may be insinuated into the bowel and thus aid the escape of gas.

The *diet* of the patient for twenty-four to forty-eight hours, until the stomach is relieved of the irritation following anæsthesia, should consist of liquids, as beef-juice, broth, milk and lime-water, etc. After this a modified semiliquid diet is best unless it is desired to keep the bowels locked, when concentrated food in small quantities should be given until after the bowels have been moved. The patient may be allowed to chew tender broiled meats, discarding the fibre. This gives a little variety

to the food and tends to allay the dryness of the mouth, which is so apt to result when foods which do not require mastication are exclusively employed. A little pulled bread, Zwiebach, or toast is sometimes permitted with the liquids once or twice daily.

If the operation does not involve the anal sphincter, the patient may be placed on ordinary plain diet by the third or fourth day. It should always be remembered that when patients are confined to bed, their digestive processes are not so active as when they are exerting themselves; therefore foods with much residue, as meats and vegetables, should be used in moderation.

Removal of Sutures.—The deep perineal sutures, or stitches, should be removed in about seven to ten days. The rectal sutures do not always require removal. The nurse will need to place the patient across the bed for the purpose, drawing her hips close to its edge and flexing the limbs. Her limbs should be protected by slipping on a pair of drawers and stockings. A sheet should in addition be thrown over her and draped around the limbs. A sheet or napkin should be placed under her hips.

A chair for the surgeon should be placed in front of the patient, and a sheet or towel thrown over his knees as he takes his seat.

As the surgeon usually desires to give a vaginal injection before removing the stitches, if he has not directed the nurse to attend to giving this injection herself, she should have in readiness the antiseptic solution

required, a syringe, and a bed-pan. The instruments—straight, sharp-pointed scissors and a pair of anatomical forceps—should be placed in a tin basin and immersed in a bath of sterile water. An antiseptic solution, as 1 : 1000 of bichloride of mercury, should be prepared in a china or agate basin for the sterilization of the doctor's hands.

A pus-pan or piece of paper for receiving the stitches

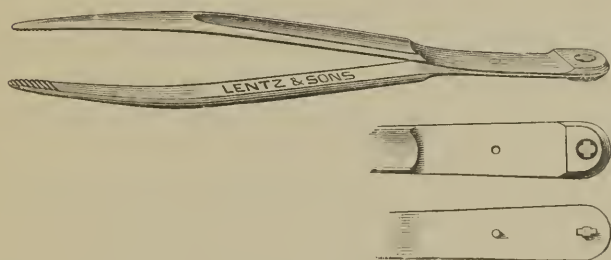


FIG. 62.—ASEPTIC ANATOMICAL FORCEPS.

The two branches being separable, are more readily cleansed.

as removed should be placed on the bed, within convenient reach of the surgeon. The nurse should then support the patient's limbs, or, if there are other assistants to do this, she will assist the surgeon in giving the douche, and in obtaining for him or handing him the various articles required as he needs them. After the removal of the stitches she assists in putting the patient properly back in bed and removes the articles which were used in the operation.

The patient will need to be kept quiet, as a rule, for a day or two after the removal of the stitches. The nurse should, however, always learn from the surgeon his special wishes concerning the subsequent management of a case.

In **partial rupture of the perineum** the management is practically the same as in complete rupture, except that there will be less fear of damage when the bowels are opened on the third or fourth day, and that the stitches are usually removed at the end of a week.

The operation for repair of the perineum is known as *perineorrhaphy*. The various methods of doing this operation are known by the names of their different inventors.

Elytrorrhaphy or **colporrhaphy** are commonly known as *vaginal operations*—that is, operations on the vagina for the relief of prolapsus, or falling of the womb.

The after-treatment is much the same as in cases where rupture of the perineum has been repaired. The patient will need to lie in bed for about two weeks, and the bladder must never be allowed to become distended, or the cicatrix will be stretched or broken down. Sometimes the bladder is kept emptied for some days by the use of a self-retaining catheter. The sutures are removed from the tenth to the fifteenth day, unless absorbable sutures, of catgut, have been used. The patient will need to avoid active exercise for many months.

Trachelorrhaphy is an operation done for the repair of the cervix or neck of the womb when laceration

exists. It is frequently spoken of as a *cervical operation*. Before this operation is performed, the surgeon generally has the patient put upon preparatory treatment for a week or two, to remove all tenderness and congestion. Hot-water injections daily, sometimes several times a day, are ordered, after which the doctor may apply medicated tampons to the cervix.

Some surgeons prefer the semiprone or Sims position for this operation, as this enables the neck of the womb to be brought within easy reach. The operation is more frequently performed with the patient on her back, in what is called the dorsal or lithotomy position.

After-care.—The patient should remain in bed a fortnight or more after the operation and maintain the recumbent position, so that there may be no strain upon the stitches. Some counter-irritant, as burning fluid, is frequently applied on cotton over the lower part of the abdomen, or an ice-bag may be kept applied with a strip of flannel between it and the skin. The bowels should not be allowed to get constipated, a movement being secured by means of laxatives daily or every other day.

The patient's *dict* need not be restricted. After the second day, especially if there be much discharge, a vaginal injection of tepid water, containing some anti-septic (as bichloride of mercury 1 : 4000), may be employed.

The sutures are usually of some absorbable material, and therefore do not require removal. When they do,

the patient may be placed in Sims' position for this, and the nurse will have to hold the speculum and support the right buttock, the patient lying on her left side, and *vice versâ* when she lies on her right side, while the surgeon *removes the stitches*. Frequently the sutures are not removed until the fourteenth day, or even later. The patient should be kept quiet for some days after the removal of the stitches, not even sitting up in bed. This is to give time for the cicatrix to grow stronger. The nurse will, of course, observe the wishes of the surgeon in this as in other matters pertaining to the nursing.

Amputation of the cervix is an operation for the removal of the diseased neck of the uterus. Preparation for this operation and its after-care will be similar to that required for the operation for laceration of the cervix.

Operations for fistulæ are not infrequent. A fistula is an unnatural opening produced by sloughing of the tissues. It may be the result of cancer, but in operable cases is more frequently the result of childbirth. The constant pressure of a pessary worn too long may cause it. An opening may in this way be formed between the bladder and the vagina, in which case it is called a *vesico-vaginal fistula*, or it may be formed between the bowel and the vagina, when it is called a *recto-vaginal fistula*.

Constant dribbling of the urine is occasioned by the former condition, while escape of fæces through the vagina is a result of the latter.

The lithotomy position is that usually employed in doing the operation, or examining for the condition. A Sims speculum retracts the perineum. When it is difficult to detect the fistula, warm milk may be injected into the bladder or rectum, and the vagina watched to discover where it makes its exit. This will betray the position of the fistula.

Should a fistula occur as the result of a difficult delivery, it is possible that, if at once discovered and properly treated, it may heal without an operation. The vagina should be kept perfectly clean by frequent syringing with warm antiseptic solutions, and a self-retaining catheter should be placed in the bladder and the latter thus kept empty.

In performing the **operation for vesico-vaginal fistula**, the surgeon will have the patient placed in the position he may prefer—the lithotomy, the semiprone, or the genu-pectoral. The lithotomy position is usually employed. The bowels should be thoroughly cleared out by a laxative administered about forty-eight hours before the operation, and an enema an hour or two before the operation. The patient's limbs may be held by the leg-holder, the hips being placed over the operating pad. When all the stitches have been tied, the vagina and the bladder are washed out with warm sterile water. If water is found to escape from the bladder into the vagina from the site of the wound, which may need to be determined by injecting milk again into the bladder, the operator will need to insert more stitches. *After the*

operation a self-retaining catheter must be placed in the bladder to keep the urine drawn off. Some operators do not do this. A form of catheter sometimes employed is the short catheter with a bulbous extremity to prevent its slipping out of the bladder. The sigmoid or S-shaped catheter requires more frequent removal for cleansing, and is more apt to do injury upon its withdrawal and introduction, which must be done daily for cleansing it. The upper curve of the S is intended to hold the catheter in place by resting against the pubic bone. The bulbous catheter may be made of hard



FIG. 63.—S-SHAPED CATHETER.

rubber or vulcanite, and will need occasional removal for cleansing purposes. It is best washed in a strong solution of acetic acid. The soft-rubber catheter serves the purpose of drainage very well, and probably produces less irritation than either of the forms described. It will need to be watched to see that it does not slip out of the bladder. If passed through a small opening made in the vulvar dressings, it is, perhaps, held in place better than in any other way.

After the operation the patient is placed in bed, on her left side. When a catheter has been introduced as

described, a urinal should be placed in the bed, behind the bent knees. A piece of flexible-rubber tubing is fitted on to the catheter at one end, the other being passed into the urinal. When the patient is permitted to lie upon her back, the receptacle for urine will need to be placed beneath her limbs. It is more liable to be pushed out of place in this position. The nurse must frequently empty and cleanse the receptacle, to keep the bed free from odor.* The *bowels* must be kept in good condition, no hard masses being allowed to collect in them, so as to cause irritation. No straining effort

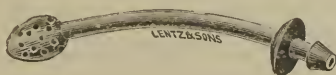


FIG. 64.—BULBOUS CATHETER.

should be permitted. The fecal masses, if they exist, may be softened by the injection of a gill of warm cotton-seed oil; in three or four hours a pint and a half of soap and water may be injected. Should several hours elapse and the enema be retained, it is a good plan to introduce a tube (as the long vaginal nozzle) to the extent of about four inches, letting the outer end rest over a soap-dish containing a little water. The

* Some operators prefer having a long piece of rubber tubing fastened to the self-retaining catheter, the other end hanging over the side of the bed and emptying the contents of the bladder into a vessel at the side of the bed.

tube, if left thus ten or twenty minutes, will usually carry off a quantity of flatus, and then the patient will, as a rule, have a free motion. Should the first enema prove unavailing, the process may be repeated.

Before the stitches are removed, a free evacuation of the bowels should be obtained, and the vagina cleansed with an antiseptic solution. The sutures are removed about the eighth or tenth day. The patient is placed in the semiprone position, and Sims' speculum used. For this process the patient is best placed on a table, as a good light is required.

Some of the *complications* which may occur after this operation are as follows :

Hemorrhage into the bladder—perhaps the most common accident—is shown by the color of the urine drained off, and, if managed in the beginning by injections of warm water, can thus be usually checked. If irritation of the bladder, however, persists, and it is found that the bladder is distended, yet nothing can be drawn off by the catheter, the distention must be due to clots, and the surgeon may have to reopen the fistula and remove the clots. Sometimes *severe pain* occurs extending from the kidney on one side down to the bladder. This symptom should be promptly reported, as it may imply that a ureter has been closed, and the removal of some stitches may be necessary.

Cystitis, or inflammation of the bladder, is often a serious complication, as it leads to pain and a constant desire to empty the bladder, hence straining efforts

which may prevent the healing of the fistula. The bladder may need to be washed out frequently with warm water containing boric acid or chlorate of potash, and the self-retaining catheter can not be worn. The surgeon will attend to the process of washing out the bladder, and the nurse should not attempt it unless directed by him. Warm poultices over the lower part of the abdomen and flaxseed-tea or other diluents may need to be administered. Thus, a tumblerful of flaxseed-tea may be administered once in three or four hours.

In **recto-vaginal fistula** the operation is conducted on the same principle as when a vesico-vaginal fistula is treated. The bowels must be thoroughly cleaned out by an aperient administered twenty-four hours before operation, followed by an enema some hours before the patient is placed upon the table.

A rectal tube or large-sized English catheter will need to be retained in the bowel after operation, to carry off flatus and prevent distention, which may strain the stitches. If the rectal sphincter has been well stretched by the operator, this is usually not necessary. The rules for after-treatment will be the same as in repair of complete rupture of the perineum. The chief trouble will consist in deciding as to the time when the bowels may be moved with safety. Efforts should be made to secure a soft movement by means of the oil enema, as already described, followed by the soap-and-water enema. Laxatives may at the same time be given by mouth.

The removal of a urethral caruncle is another

operation frequently performed. The caruncle is a small, sensitive tumor, sometimes of quite a bright-red color, which is found at the entrance to the urethra. It causes pain and difficulty on urination; hence should be removed. When such growths cause no unpleasant symp-

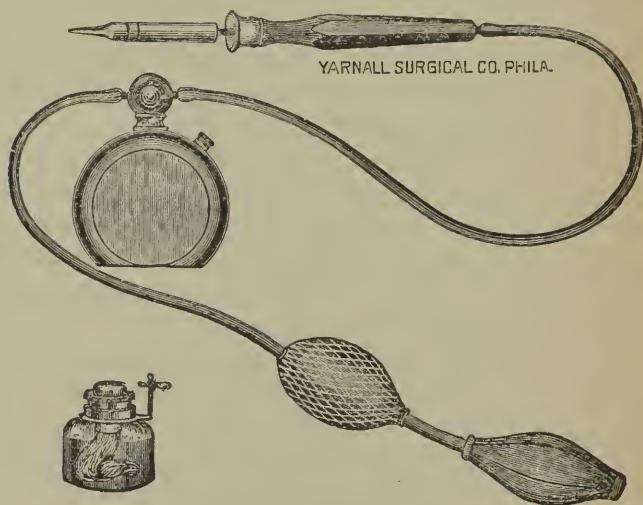


FIG. 65.—THERMO-CAUTERY (PAQUELIN'S).

toms, as is occasionally the case, it is not necessary to disturb them.

For this operation the patient should be placed in the lithotomy position, and the urine drawn off after she has been etherized.

The Paquelin *thermo-cautery* is frequently used to

sear the bleeding surface left by the removal of the tumor. The nurse may be called upon to prepare the cautery and have it in readiness. The finest point being fitted to the handle, it should be allowed to rest over the flame of an alcohol-lamp until well heated. The rubber bulb at the end of the tube may then be compressed repeatedly and rather rapidly by the nurse until the point of the cautery becomes red hot. The vial containing benzol should be kept at a safe distance from the lamp and from the red-hot point, as the fluid is inflammable. The vial is usually provided with a hook, by which it may be fastened to a button-hole in the waist of the nurse's dress. One hand is then free for compression of the bulb and the other holds the cautery by its wooden handle. When the point of the cautery is red hot, it may be removed from the flame of the lamp and the heat kept up by compression of the bulb, which forces the vapor of the benzol into contact with the lower portion of the cautery. When the point seems to be getting cold, rapid compression of the bulb will again heat it up.

After the surgeon has finished with the use of the cautery, it should be heated to a white heat by rapid compression of the bulb and the tubing pulled off the handle while it is still hot. This sudden cooling helps to preserve the point. The same instrument will sometimes be needed in the treatment of hemorrhoids; also for cauterizing the stump in abdominal section.

The *after-treatment* in a case of urethral caruncle is

very simple. The patient should be kept quiet in bed for a few days, and the urine should be drawn off about once in six hours for the first day, if the patient is unable to pass it. Care must be taken to produce no irritation by the use of the catheter, which should be thoroughly sterile and skilfully employed. It is much better to have the patient void urine herself. Sometimes when she can not do this on her back, it can be effected by allowing her to turn over on her face as she lies in bed.

The use of some diluent drink will aid in making the passage of urine less painful.

The removal of hemorrhoids is accomplished in various ways. Sometimes the *clamp and cautery operation* is done, at other times *excision*; a third method is little in vogue at the present time—that of removal by *ligature*.

After the removal of hemorrhoids or piles the patient often suffers considerably from swelling and throbbing pain. If but a portion of them have been removed, the others may be temporarily much distended. A small bag of crushed ice applied to the anus, which is protected by a few thicknesses of antiseptic or sterile gauze, or lint kept saturated with lead-water and laudanum, or some similar soothing application, will frequently give great relief. A T-bandage and antiseptic pad will need to be worn by the patient, and these will serve to hold the applications in place.

For the *relief of hemorrhoids* preparatory to operation

the application of cloths wrung out in hot water to which a little witch-hazel is added will serve to shrink them, and then, being anointed with vaseline or some simple ointment, they should be returned into the bowel.

Care to secure *movements of the bowels* which are soft in consistency will be one of the chief objects in a nurse's attentions. The measures already described in the use of oil and soap-and-water enemata, combined with a laxative, are most effectual. The patient's *diet* need not be restricted, excepting that solid foods containing much residue should be avoided. She may need to be confined to bed from ten days to two weeks, according to the severity of the case.

Lithotrity and lithotomy are operations for removal of stone from the bladder which are occasionally done through the urethra and vagina. The preparations for these, as for other pelvic operations, consist in free purgation and rest in bed for a day or two. After the operation all efforts will be needed to allay irritation.

The patient must remain in bed, and *mild drinks* will probably need to be frequently administered, as flaxseed-tea, barley-water, soda-water, milk, etc. After lithotrity (crushing of the stone) the bed-pan and urinal should be used, and all fragments of the stone kept for the doctor's inspection.

In lithotomy special provision will have to be made by means of pads for the *protection of the bed* from the dribbling of urine. Sometimes a tube is left in the

wound for a few days, and the nurse will need to learn from the surgeon what he desires done to keep it free from obstruction. The nurse must make every effort to *keep the patient quiet, clean, and dry*. The hips and buttocks must be washed frequently and oiled, to prevent irritation from the constant escape of urine through the wound.

Any appearance of blood in the urine must be reported to the surgeon; also any disposition to chilliness, profuse perspiration, tenderness about the lower part of the abdomen, etc.

Both these operations are done with the patient lying upon her back.

When *supra-pubic* lithotomy is done, the operation becomes one of abdominal section, and will require similar preparations to other operative procedures of the kind.

Abscess of the pelvis, which may point either externally or internally, sometimes demands the use of an apparatus known as the *aspirator*, which draws off the contents of the abscess by suction. A vacuum is produced in the bottle, as shown in the cut, by exhausting the air by means of the barrel-and-piston syringe. The return of air to the bottle being prevented by turning the small button on the side next the syringe (A) to close off communication there, and the valve on the opposite side (B) being opened by adjusting the button on the needle-side properly, a suction power is set up which draws out the contents of the abscess. A very

thorough cleansing of the apparatus is necessary after such use.

Instead of employing *aspiration*, the surgeon may make a *free incision* into the abscess and evacuate its contents through the vagina. Irrigation of the vagina by the use of an antiseptic douche at the time of operation will be necessary; also the probable use of gauze drainage.

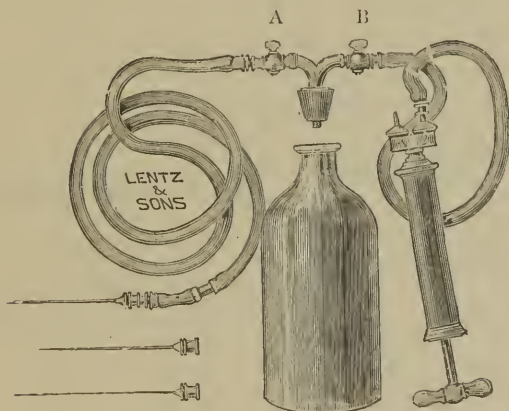


FIG. 66.—ASPIRATOR AND NEEDLES.

The *management* of the case afterward will be directed by the surgeon and will depend on the location of the opening if one is made. If in the vagina, antiseptic douches will be required. If an external opening, a daily washing out of the abscess-cavity and redressing of the wound may be necessary.

Operations for dilatation and curettement of the uterus, or removal of polypi or retained placenta, will demand similar preparations to those required for all pelvic operations. Especial care must be given to the employment of an antiseptic vaginal injection just before operation. The patient must be placed in the lithotomy position. During the operation the uterus will probably need to be washed out. For this purpose

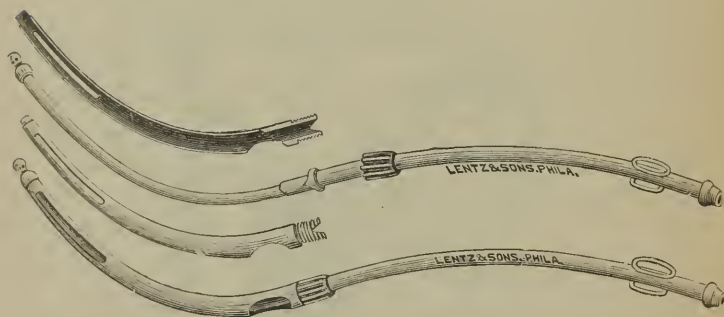


FIG. 67.—INTRA-UTERINE RETURN CATHETER.

the *intra-uterine syringe*, one form of which is shown in the cut, may be employed. The lower figure shows the instrument as it is put together for use, the upper shows its separation into its three constituent parts. It may be thus more thoroughly cleansed and rendered a safer instrument for use in different cases.

One end of a piece of flexible-rubber tubing is slipped over the outer end of the catheter, and the other end

over the nozzle connected with a fountain syringe. The solution used is contained in the rubber bag of the syringe, and, flowing down through the tubing and into one channel of the intra-uterine syringe, is carried into the uterus, being carried back through the other channel. Care must be taken, in using these instruments, to see that the return flow is free. If not, it may be possible that the instrument is clogged by a clot of blood or some shreds of tissue. It must then be removed and cleaned and reinserted. A thorough boiling or steaming of the instrument, after taking it apart, should follow its use.

After such operative procedures upon the uterus an ice-bag is frequently applied over the lower part of the abdomen, in order to counteract any tendency to inflammatory involvement.

Vaginal hysterectomy is an operation for the removal of the uterus through the vagina, and is most frequently done for cancer.

The patient is prepared as for perineal operation and placed in the lithotomy position upon the table, the limbs being held by the leg-holder. The *after-management* of the case will be dependent upon the methods preferred by the surgeon. If forceps are used to clamp the vessels instead of ligatures being applied, they will extrude from the vagina, and the nurse will have to be careful in watching them to see that they do not loosen and drop off, and that there is no strain on them in the slight changes of position to which the patient may need to be subjected. They are best supported

by a little pillow or pad placed just beneath the handles of the instruments. The patient should be kept very quietly upon her back and all movements avoided until after the removal of the clamps, in two or three days. Quiet should be maintained after the removal of the clamps, to avoid the danger of secondary hemorrhage, until the surgeon declares all danger past. Antiseptic pads should be kept beneath the patient and frequently changed.

When ligatures are used, a thick pad of sterile wool or gauze is laid over the vulva, after the tamponing of the vagina. These dressings should be frequently inspected and changed if necessary. Extreme care as to thorough asepsis will need to be practised. The ligatures, as a rule, come away of themselves. If not, the surgeon may remove any sutures he may have introduced, and the remaining ligatures at the end of two weeks. The patient will have to be placed on a table in the lithotomy position for this, and a Sims speculum used to depress the perineum.

As very especial *danger of hemorrhage* exists after this operation, extreme watchfulness will need to be exercised by the nurse in the care of a case of vaginal hysterectomy, and a frequent inspection should be made of the dressings to discover the amount and character of the discharge.

Operations on the breast may be done for the removal of tumors or cancer. The armpit must be shaved and the breast made thoroughly clean by soap and

water, followed by ether or turpentine for removing the grease from the skin, and then a thorough cleansing with bichloride solution 1 : 1000. The breast is then carefully enveloped in antiseptic dressings until the time for operation. The patient is prepared as for other operations. At the time of operation the clothing may be removed from the side to be operated upon and slipped from the patient's back as she lies over the operating-pad. A thin sheet of rubber gossamer or, in a private house where this can not be had, a folded sheet should go under the breast and arm of the affected side, being turned in over the clothing and fastened upon the opposite shoulder toward the front by a shield-pin. This will cover the chest and the breast of the unaffected side. A sterilized sheet or towels should be used tucked in over the edge of the rubber protective.

The dressings should not be removed from the breast until the operator is ready to begin. If there is any delay, a sterile blanket may be thrown over the patient's shoulders until the surgeon is ready.

The table for operation should be arranged as in any other operation, except that the operating-pad should be placed at the upper part of the table, under the affected shoulder. Sterilized towels may be placed over the rubber cloth protecting the patient's clothing. Special dressings will need to be prepared for the case ; thus, a large antiseptic pad which shall reach front and back to the median line of the body may be applied over the side of the chest whence the breast was removed,

and this held in place by roller bandages firmly applied or by adhesive strips two to three inches in width, or a straight bandage may hold the antiseptic dressings in place, and a second one employed to hold the arm firmly pinned down to the side. These bandages may be prevented from slipping by a strip of roller bandage fastened front and back to their upper edge and passing over the shoulder.

The patient should be kept perfectly quiet *after the operation*. A little pillow 8 × 10 inches, of down or feathers, may be slipped under the arm of the affected side to support it and keep it from dragging down. The nurse must watch especially for any tendency to hemorrhage. As the blood will naturally run under the patient's back, owing to her position, she must be gently lifted or rolled toward the opposite side from time to time and the back examined. Liquid food should be used for two or three days, until the patient's stomach is in proper condition for ordinary food. Fresh dressings, and bandages should be in readiness for the surgeon, as he may desire at any time to *redress the wound*. Should any discharge come through the dressings, the surgeon should be at once notified of this, as it will be necessary in such case to change the dressings. The same antiseptic precautions should be observed in this re-dressing as in the original dressing of the wound.

Inflammation and abscess of the breast may sometimes occur as a result of injury or of overdistention of

the breast with milk during lactation. In preparing for the operation of lancing the breast, the nurse will need to cleanse the breast thoroughly and then wash it with an antiseptic solution and apply antiseptic dressings to keep it sterile until the time for operation. She should have in readiness a number of sterilized towels, a pus-pan or basin in which to catch the discharges, a tin basin or tray containing sterilized water for the instruments, an agate or china basin with a bichloride of mercury solution, warm water, soap, nail-brush, etc.

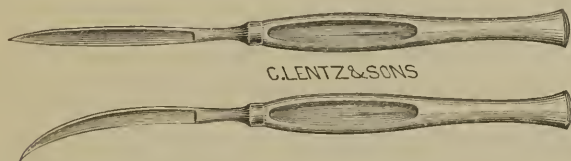


FIG. 68.—BISTOURIES, STRAIGHT AND CURVED.

The patient's clothing should be arranged as for amputation of the breast.

The instruments used will be the bistoury, straight or curved, and possibly a probe for subsequent packing of the cavity, with a strip of iodoform gauze.

Should the surgeon wish to use *local anæsthesia* by means of ice and salt applied to the part, a bowl containing a small quantity of salt and a piece of smooth ice the size of a small fist, wrapped in a towel (so that it can be thus held by the surgeon while the application is made) should be provided. Local anæsthesia is better

obtained by means of ethyl chloride, ether spray, etc. The surface of the body at the site to be operated upon is thus benumbed.

Antiseptic dressings may be applied to the part after lancing, or aseptic poultices may have, for a time, to be kept up.

The method of applying an antiseptic or aseptic poultice is to use several thick folds of antiseptic or sterile gauze wrung out in hot sterilized water, placing a piece of rubber tissue over this and binding in place by a bandage. This may be reapplied every two or three hours.

The abscess-cavity will probably need to be washed out daily with an antiseptic solution and the breast redressed.

Removal of tumors from the vulva and vagina will require care similar to that already laid down for operations upon the perineum and vaginal walls.

ANÆSTHESIA.

The administration of an anæsthetic, as ether or chloroform, does not often devolve upon the nurse; occasionally, however, the physician is obliged to call upon the nurse to aid him in this direction; it is therefore important that she should understand how to conduct the process. For general anæsthesia ether is preferable to anything else, because it is much the safest anæsthetic known. Chloroform is more dangerous because of its direct action upon the heart.

A patient should be prepared for etherization by taking nothing into the stomach for several hours previously. All the clothing should be loosened, false teeth should be removed, and the patient placed in a recumbent posture. The patient may be made to feel less nervous by one's placing the inhaler or towel over her mouth without any ether upon it and teaching her to draw deep breaths for a few seconds. A small handkerchief, loosely folded, may be saturated with about an ounce (two tablespoonfuls) of ether and held over the patient's mouth and nose, a dry towel being held over this to prevent the evaporation of the ether. The eyes may be covered by this towel. It is well to tell the patient to blow away the ether-vapor, as this leads her to take a deep breath for the purpose of refilling the lungs. No talking should go on in the room, if possible, as the patient should be kept free from excitement. When inhalation has fully begun, the ether-cloth should not be removed from the patient's face, but more ether added by simply lifting the dry towel and adding the ether to the cloth beneath it. Should the patient stop breathing for a moment or the face become blue, the ether should be removed for a moment from the face. When a deep breath has been taken, the inhalation should be renewed. When during the stage of excitement the patient struggles and screams, the ether-cloth should be held closely to the face, because giving her more air will simply make her noisier. The deep inspirations induced by crying and shouting often enable anæsthetiza-

tion to be more quickly effected. Retching is another symptom for which the ether should not be removed. If, however, the contents of the stomach are brought up into the throat and mouth, the etherization must be stopped until the mouth and throat have been cleared, or there will be danger of choking. The ether should be stopped for just as short a time as possible. When the mouth and throat become filled with an excessive secretion of mucus, it is also necessary to stop for a time and clear this away by carrying the finger into the mouth or by turning the patient over for a moment on her face or letting her head hang down over the operating-table. When the patient breathes heavily, the muscles are all relaxed, and on lifting the eyelid and touching the eyeball the patient does not flinch, etherization is complete, and the operator will be able to begin his work.

The ether will after this need to be administered in very small quantity. When the patient is breathing heavily, making a snoring sound (stertorous breathing), the ether should not be pushed, but the towel held some distance from the face. If she appears cyanosed, it is well to give some inhalations of oxygen gas. This comes in convenient form in metallic cylinders, with the necessary apparatus for administration attached. A glass nozzle connected with the outlet-tube of the cylinder is introduced into one nostril of the patient, the other being lightly compressed with the finger. Thus, the oxygen is drawn into the air-passages. Sometimes, with feeble

patients, oxygen is administered throughout the operation along with the ether.

Whenever ether is administered, it should be remembered that its vapor is inflammable and so heavy that it falls to the floor ; so that any light, as a candle or alcohol-lamp, should be placed at a distance from the operating-table and on a higher level.

When breathing ceases entirely and failure of the heart seems to threaten, the patient's body should be inverted, and stimulants, as digitalis, atropia, or aromatic spirit of ammonia, used hypodermically. Every effort should be made to get the patient to take a full breath. The tongue should be drawn forward out of the mouth, the cheeks and chest slapped with a towel wrung out in cold water, artificial respiration may be resorted to, or the use of electricity. Forcible stretching of the anal sphincter will often induce a respiratory effort.

THE NURSE'S ARMAMENTARIUM.

A few words may be said in this connection of the nurse's armamentarium—the articles she will need to take with her to assist in the management of the cases she nurses.

A little pocket-case, containing a clinical thermometer, straight scissors (sharp-pointed and blunt-pointed), a pair of anatomical forceps, a probe, a hypodermic syringe, and a female catheter, is a convenience. A French soft-rubber catheter is often a necessity. Besides these, the nurse will need a medicine glass, a feeder, and a

nail-brush of her own; possibly a wall thermometer or bath thermometer might be added to the list, and a Davidson syringe with the necessary nozzles, as this may save her delay in the use of the douches, etc., as ordered, in case the family should not have anything of the kind.

Careful written reports should be kept of each case she nurses, and some blanks, with the proper headings, should be carried by her to each case. Thus properly equipped, she will be able to work more efficiently and satisfactorily to herself and to her patient.



APPENDIX A.

GENERAL SURGICAL CONDITIONS AND PROCEDURES.

An abscess is a circumscribed collection of pus shut off by a wall of lymph from surrounding structures. Abscesses may be *acute* or *chronic*. The latter are sometimes called *cold abscesses*. The local treatment for all abscesses is early evacuation by means of an incision made with a sharp bistoury.

Acupressure is a method of controlling arterial hemorrhage by thrusting a needle or pin through the tissues in such a way as to compress the artery.

Acupuncture is a species of counterirritation which is effected by thrusting steel needles two to four inches in length deeply into the subcutaneous tissues. They should be sterilized by boiling before use.

Amputation consists in the removal of a limb. The usual antiseptic precautions must be observed in the preparation for an operation that are essential in all wound surgery. The chief danger immediately after operation is from hemorrhage. In case of such amputations as those of the thigh or of the hip-joint, this danger may continue for two weeks. Means for controlling hemorrhage should be at hand, such as a tourniquet or Esmarch rubber tubing. When these can not be obtained, a firm roller or handkerchief bandage may

be made to serve the purpose. Hemorrhage may be avoided by carefully supporting the limb by pillows or elevating the foot of the bed. The patient should be kept quiet and the stump relieved of pressure by a cradle placed underneath the bed-clothes. Stump-dressings are sometimes made in the form of a Maltese cross, but this is not essential. Retractors (consisting of pieces of sterilized muslin six or eight inches in width, one end of which is split into two or three tails) will be required during the operation. Two tails are required when one bone is divided, and three when two bones are divided, as in the forearm. They serve to hold back the flaps.

Appendicitis is an inflammation of the vermiform appendix. Preparations for this operation and its after-care should be identical with those required for any abdominal section. The condition may be treated medically by blisters, leeches, or other counterirritation. Ice-bags are sometimes applied to allay inflammation.

Artificial respiration, or the effort to force respiration, is called for in cases of drowning, profound anæsthesia, or the inspiration of poisonous gases, or any cause which may check the function of breathing. Care should always be taken to see that there is nothing in the mouth, nose, or throat which will interfere with the entrance of air to the lungs, as mucus or liquids, etc. All tight clothing should be removed, and the procedure should be kept up for some time. The surface of the body should be kept warm during the operation.

The methods employed are numerous, and known by the names of their inventors, as Sylvester's, Marshall Hall's, Howard's, the Byrd-Dew methods, etc. Howard's method of direct artificial respiration is the one employed by the United States Life-saving Service. The rules for it are given as follows by Dr. Howard: (1) Expel water from the stomach and lungs, strip the patient to the waist, and if the jaws are clenched, separate them and keep them apart by

placing between the teeth a cork or small piece of wood. Place the patient face downward, the pit of the stomach being raised above the level of the mouth by a large roll of clothing placed beneath it. Throw your weight forcibly two or three times upon the patient's back, over the roll of clothing, so as to press all fluids in the stomach out of the mouth. (These directions are only necessary to be followed in cases of drowning.) (2) To perform artificial respiration, quickly turn the patient upon his back, placing the roll of clothing beneath it so as to make the breast-bone the highest point of the body. Kneel beside or astride the patient's hips. Grasp the front part of the chest on either side of the pit of the stomach, resting the fingers along the spaces between the short ribs. Brace your elbows against your sides, and, steadily grasping and pressing forward and upward, throw your whole weight upon the chest, gradually increasing the pressure while you count *one, two, three*. Then suddenly let go with a final push, which springs you back to your first position. Rest erect upon your knees while you count *one, two*; then make pressure again as before, repeating the entire motions at first about four or five times in a minute, gradually increasing to about ten or twelve times. Use the same regularity as in blowing bellows, and as seen in the natural breathing which you are imitating. If another person is present, let him with one hand, by means of a dry piece of linen, hold the tip of the tongue out of one corner of the mouth, and with the other hand grasp both wrists and pin them to the ground above the patient's head (Wharton).

Inflation of the lungs may be accomplished by passing a flexible catheter, or an intubation tube with a rubber tubing attached, into the trachea, through which the operator blows into the air-passages, either directly or by means of a rubber bulb or bellows.

Aspiration is the removal of fluid from a closed cavity without the admission of air. The instrument used is called

an *aspirator* (see Fig. 66). The aspirator is frequently employed in cases of hydrothorax, empyema, ascites, etc., and to evacuate cold abscesses. It is also sometimes used to determine the character of the contents of deep-seated tumors.

Bandages are surgical dressings used to hold gauze compresses, poultices, or splints in contact with the surface of the body. They are of various materials, as linen, flannel, crinoline, cheese-cloth, rubber sheeting, muslin, etc. They are *simple* when composed of one piece of material, such as the ordinary roller bandage, or *compound*, when prepared of one or more pieces, as the T-bandage, or many-tailed bandage.

The *roller* bandage is a strip of woven material from six to eight or twelve yards in length and varying width, which for convenience in application has been rolled into the cylindrical form. A bandage rolled into the form of a single cylinder is called a *single* or *single-headed* roller, while one rolled from each extremity toward the centre, so that it forms two cylinders joined by the central strip, is called the *double* or *double-headed* roller. The free end of the roller bandage is called its *initial* extremity; the other end, the *terminal*; the portion between the extremities, the *body*. A roller has two surfaces, an *external* and an *internal*. According to the method of application, a roller bandage is described as circular, oblique, spiral, spiral-reversed, spica, figure-of-eight, and recurrent.

Handkerchief bandages are square pieces of muslin for the dressing of wounds, fractures, or dislocations. They are sometimes applied as a *triangle*, again as a *cravat* or *cord*, or they may be applied in *oblong* form.

Fixed dressings are made by incorporating a variety of substances in the meshes of some bandage-material, such as crinoline or cheese-cloth. The materials most commonly used are plaster of Paris, silicate of sodium or potassium, and starch. Paraffine, or a mixture of chalk and gum, or oxide of zinc and glue, are sometimes used. Practical work in

the preparation and application of the various kinds of bandages is essential to a proper understanding of them. For the removal of plaster dressings, a special saw and scissors for cutting plaster are required.

Bites of venomous snakes demand the prompt removal of the part bitten. It is also best to treat the *bites of dogs* in the same way, if the dog be rabid.

It is well always to encircle the part above the wound, if possible, by a ligature at first and to make an effort to suck out the poison, after which a cautery may be heated and carried down into the wound, or a heated nail or knitting-needle carried into it. The patient should be given whiskey freely until medical aid can be secured, and, if necessary, the operation of excision carried out. The saliva should not be swallowed after sucking a poisoned wound.

Bites or stings of insects are rarely dangerous. Cold wet applications, as wet earth, are good. A drop of hartshorn or wet salt has been found to give great relief, or a carbolic acid wash.

All bites should be sucked, carefully cleansed, and cold applied to them for a time to prevent the occurrence of inflammation.

Bruises, or contusions, are wounds of the soft tissues caused by blows. They are sometimes very painful and accompanied by considerable discoloration, due to the escape of blood under the skin. It is best at first to treat them, when painful, by the application of cold wet cloths. Laudanum may be used. Later, to favor the carrying off of the discoloration caused by the blood, hot wet cloths are best.

Burns or scalds are dangerous in proportion to their depth and the amount of surface they cover.

When the clothes are on fire, the wearer must not be allowed to run about, but should be made to lie down and be covered with a rug or blanket or anything at hand that will exclude air and smother the flames. After extensive burns and scalds the clothing to be removed must often be clipped

away, so as not to burst blisters that have formed and tear the skin. Afterward blisters may be punctured at the most dependent part and the serum allowed to run out, but this should not be done until the surface of the burn has been made aseptic by irrigation with some antiseptic solution. It may then have simply a dry aseptic dressing applied. In some hospitals it is customary to apply on lint "Carron oil," consisting of equal parts of linseed oil and lime-water.

Extensive burns are, also, sometimes treated by continuous immersion in a bath at a temperature of about 100° F. Stimulants are usually needed to counteract shock, and laudanum or opium in some form for relief of pain.

Slight burns or scalds may be treated by applying a wet cloth soaked in a strong solution of baking-soda, or the baking-soda may be powdered on and dampened afterward. Simple cold water is one of the best remedies, the part being kept immersed in it for a long while.

Burns with acids are also best treated by plenty of cold water and then dressed as other burns. Burns with caustic alkalies are well treated by an application of vinegar, followed by one of oil.

Carbuncles are caused by a suppuration of the subcutaneous tissue under the thick skin, usually back of the neck. They are larger than boils and have no central core, but suppurate at several points and are accompanied by extensive sloughing. They require incision, antiseptic cleansing, and the application of antiseptic dressings. The patient's strength must be supported by good food and tonics.

Chilblains are caused by exposure to cold followed by a sudden heating of the part. The treatment is the same as for *frost-bite*; both are caused by the temporary loss of vitality in a part due to cessation of circulation in it. Frozen parts must be rubbed with snow or ice-water to start up the circulation. As the temperature of the part rises, alcohol or vinegar and water may be used instead. The temperature of the cold room in which the patient is first treated should be

gradually increased ; or the patient may be taken to a warmer room. The general condition may demand stimulants. Chilblains are usually due to repeated freezings. The chronic condition requires medicinal applications.

Cupping is used to relieve pain and congestion. *Dry-cupping* brings the blood to the surface. *Wet-cupping* is done with a scarificator.

For dry-cupping the nurse will need to provide two or three cupping glasses or wine-glasses, alcohol, a candle or lamp, matches, towels, and a basin of hot water. A little alcohol may be applied (by means of cotton twisted on a match or applicator), to the interior of the cupping glass, avoiding the rim. It is then lighted by applying over the flame of the lamp, and turned over quickly upon the part to which it must be applied. The skin rises almost immediately in the interior of the glass and the blood is drawn to the surface. To remove the glass, the skin is pressed down on one side by means of the thumb or finger and air allowed to enter the glass.

In wet-cupping the use of the scarificator precedes the application of the dry cup. This causes blood to be drawn out into the cup.

Dislocations are displacements of the articular or joint ends of bones. Sometimes the ligaments surrounding the joint are torn. It will be necessary for a surgeon to reduce the dislocation, but preparatory to his coming, the parts should be put in as comfortable a position as possible and surrounded with cold wet cloths, to which laudanum may be added if there is much pain.

Drowning.—See Artificial Respiration.

Fainting, or syncope, is caused by a temporary weakening or pause in the action of the heart, causing a suspension of the circulation of blood in the brain and a loss of consciousness.

A fainting person should be placed flat on her back with her head lower than the rest of the body ; the clothing about the chest and neck must be loosened. Water may be sprinkled

on the face, smelling salts held to the nose, and plenty of air given her. If slow in coming to, heat may be applied to the pit of the stomach. When consciousness returns, a little stimulant, as aromatic spirit of ammonia or whiskey, may be given.

Foreign Bodies.—*Foreign bodies in the eye*, such as cinders, dust, or small pieces of stone or metal, can usually be removed by catching the upper lid by the lashes, drawing it away from the eyeball and down over the lower lid, then letting it go, so that the inner surface of the upper lid is swept by the lower lid. If this does not do, the upper lid must be everted, or turned inside out. Seize the lashes between the thumb and finger and draw the edge of the lid away from the eyeball. Take a slender pencil and place it against the eyelid parallel to its edge and just above it, and then pull the edge up and turn it over this by means of the lashes. In this way the eyelid and the eyeball also can be examined and any foreign substance carefully wiped away. Cold applications will be needed afterward, to allay the pain and tendency to inflammation left by the irritation. If unable to find a foreign body, it is best to keep both eyes closed, cold compresses being kept up until medical aid can be had.

Foreign bodies in the nose can usually be dislodged by blowing the nose very hard, or a bent hair-pin may be carefully used. When necessary to call a surgeon, the sooner it is done the better, as there is less swelling and congestion from the pressure.

Foreign bodies in the ear usually require the use of special instruments. The ear is very delicate; therefore there is great danger of injury in the use of hair-pins, crotchet needles, etc. A gentle syringing of the ear with a warm salt solution or boric acid solution is the safest plan.

Fractures are broken bones. They may be recognized by the deformity they cause, the unnatural mobility, and a grating sound produced by the rubbing together of the broken ends of bone, called *crepitus*.

Fractures are *simple* when there is no injury besides the break ; *compound* when the bone comes through the skin and there is an open wound of the soft parts. The latter are more serious than the former. In a *comminuted* fracture the bone is broken in more than one place, sometimes in several splinters. A *green-stick* fracture is an incomplete fracture, the bone being partly broken and bent. This usually occurs in children. An *impacted* fracture is where one end of a broken bone is forcibly driven into another. The chief points in the immediate treatment of fractures are: (1) To prevent further injury (*a*) by means of an improvised splint, (*b*) by proper care in conveying the patient to some place for treatment; (2) the arrangement of a bed on which the patient must lie, perhaps for weeks, and the preparations for setting the bone and caring for the patient afterward. When there is marked movement between the broken fragments, or painful spasm of the muscles, a splint for fixing the parts temporarily before moving the patient will be necessary. Whatever comes first to hand may be used—book-covers, cigar-boxes, newspapers rolled up firmly, a pillow. In case of fractures of the leg, the opposite sound limb may be used as a splint, the two limbs being tied together. In case of the arm, the upper part of the body will serve the same purpose.

Clothes should not be removed until the patient is put to bed. They should be loosened and removed from the sound side of the body first, and then will not cause so much strain when removed from the injured limb. When *hemorrhage* occurs in connection with fracture, this condition will demand attention before anything else. Temporarily, the patient should be allowed to lie in the most comfortable position, the injured part supported by an improvised splint, and the patient removed with care to some proper place for treatment. In handling a broken limb it should be grasped firmly above and below the seat of fracture. In moving the patient one person should support the fractured limb, while the others lift him on to a stretcher or bed.

In severe injuries *shock* may have to be treated by the usual measures for its management.

In the nursing of fractures after the limb has been set, the patient will need ordinary good care; proper attention to food, cleanliness, and the condition of the bowels and bladder. Care must be taken to see that bed-sores do not develop. When the fracture needs redressing, padded splints, adhesive plaster, cotton, bandages, etc., will be needed, and a basin of warm water, soap, alcohol, and towels, for cleansing the limb before applying the dressings. Plaster-of-Paris dressings or those of silicate of soda, etc., may be called for.

The surgical nurse will need to become familiar with the names and uses of the different forms of apparatus employed in the nursing of fractures, as splints, fracture-bones, extension apparatus, sand-bags, cradles, etc.; also she will need to learn to pad splints readily and roll bandages. This knowledge is best gained in seeing and handling the objects themselves. Straight anterior and posterior splints and shoulder-caps are usually called for in fractures of the humerus; right-, acute-, or obtuse-angled splints, as well as straight splints, in those of the forearm. In fracture of the femur extension apparatus is required, which the nurse must learn to prepare. For fractures below the knee fracture-boxes are sometimes used. The present tendency in surgery is to use preferably splints of plaster of Paris or silicate of soda, moulded to the part when fixation of a limb is required. An *ambulatory splint* is one so applied for a fracture of the lower extremity that the patient may go about while wearing it.

Upon the removal of a splint, massage and friction of the limb is usually called for to restore circulation and to prevent stiffness.

The *bed* upon which a fracture case lies should have a firm mattress, and it is well to have a framework over it, by which the limb may be suspended from time to time, especially when the patient's hips need to be raised from the bed (as

in case of fracture of the lower extremity) for the purpose of changing the sheet or placing a bed-pan.

Gangrene is the mortification of a part of the body produced by stoppage of circulation in it. There are two forms, *moist* and *dry*. In *moist* gangrene there is, first, pain and intense burning; redness of skin, changing to purple or greenish-black; a fetid odor, and the part is swollen and soft; sometimes there are blisters. There is a watery discharge and the line of demarcation marks the living from the mortifying part. In *dry* gangrene the symptoms are: tingling, numbness, reddish color of the skin, gradually turning darker; and finally the destroyed part becomes black, dry, and wrinkled. The weakened general condition of the patient will require supporting treatment. Locally such dressings must be used as may be ordered by the surgeon.

Gunshot wounds usually require to be treated at once by a surgeon. There is rarely much bleeding from them. When there is, the usual measures for controlling hemorrhage must be employed. The application of cold cloths to the wound to prevent inflammation may be helpful unless the patient is suffering from shock, when cold should not be employed. Stimulating doses of wine, whiskey, or brandy will in such case be called for and the application of heat to the body. If the attendant has seen the accident, he should try to remember the position of the wounded part when it was struck and the direction from which the bullet came, so as to help the surgeon in searching for it.

Hemorrhage consists in loss of blood.

It is *capillary* when it flows from the small vessels. This usually stops of itself. If not, elevation of the wounded part and the application of cold, as an ice-bag, or very hot water applied on cloths, will usually check it. Vinegar is sometimes used. *Hemorrhage from the veins* is darker in color, slow and steady in its flow. When it is severe, the application of cold and firm and continuous pressure upon and below the wound generally are sufficient to stop it. A dry antiseptic

pad and a bandage will be necessary to effect this. The surgeon may need to tie a vessel, but this is not often required in the case of veins.

Hemorrhage from arteries is much more dangerous. Here the blood is bright red and spurts or leaps in jets from an injured vessel. If the artery be a large one, life may quickly be lost. A good knowledge of anatomy is necessary to enable one to know just where compression should be made to control the flow. Sometimes thrusting a finger into the wound and making firm pressure there will stop the bleeding. The principle to be followed in the control of arterial bleeding is to obstruct the artery at the site of the wound or between the centre of the body and the cut; for it is in this direction the blood flows. A compress and bandage or a tourniquet may be employed. The above directions apply to injuries of vessels on the surface of the body. Hemorrhage from a cavity will require tamponade with long strips of sterilized gauze, or the application of some styptic. Douches of hot or cold water are sometimes employed with or without astringents.

For internal bleeding a nurse can do nothing but support the patient's strength, treat her for syncope, and apply ice-bags over the probable site of bleeding. A surgeon should at once be sent for.

Heat-exhaustion is a condition of profound depression of the system due to the action of heat. The skin is cold and moist, the pulse feeble, and the patient much in the condition of one suffering from collapse. Rest, fresh air, a cool apartment, small doses of whiskey or brandy or aromatic spirit of ammonia diluted with water will serve to restore the patient.

Heat-stroke or sunstroke is a very different condition. It is not always due to the direct rays of the sun, but rather to a prolonged elevation of the temperature of the body, usually while the patient is at work in some confined place.

It is generally preceded for some time by pain in the head and a feeling of oppression. The attack itself is accompanied

by loss of consciousness, stertorous breathing, intense burning, dry skin. All absence of perspiration. The thing to be done is to lower the temperature. The clothing should be removed, the patient wrapped in sheets and put in a cold bath containing ice. Ice should be applied to the head. When consciousness returns, the cold may be discontinued, but resumed should the patient again become unconscious or the surface of the body again become hot.

Heat-stroke is very liable to be followed by grave impairment of the intellect.

Hip-joint disease (coxalgia) is an inflammation of the structures of the hip-joint. It may come from a blow or fall, or the patient may be tuberculous. Fixation of the joint by means of an extension apparatus, or a fixed dressing of some kind, may be required. Abscesses frequently accompany this condition and require dressing. Fresh air, sunlight, and good food are called for. Bed-sores must be watched for.

Inflammation is a condition induced by irritation, by which a greater amount of blood than is normal is attracted to a certain part of the body. The symptoms of acute inflammation are heat, redness, swelling, and pain. The condition of overfullness of the blood-vessels may become chronic, in which case it is called *congestion*. Acute inflammation may terminate in suppuration or abscess formation.

If cold is applied at the beginning of any inflammatory trouble, it may subside. Ice-bags for the application of cold ; poultices or fomentations are used in the application of heat. When pus has formed, the abscess is best brought to a head by the use of hot poultices.

Intubation of Larynx.—This is an operation performed when the larynx is obstructed from any cause. It is usually called for in diphtheria. The nurse should hold the child during the operation upright in her arms, with its knees held firmly between her own, and its arms pinned down by her arms. An assistant standing behind her should hold its head in proper position against her shoulder.

The patient should afterward be fed well and will swallow best with the head on one side. Liquid food in small quantities, ice-cream, etc., may be given. If the tube is coughed up, the doctor must be sent for at once. Meantime the patient must be placed in a position in which she can breathe most comfortably. If the tube is swallowed, it is usually passed from the bowels without difficulty. The nurse should always learn from the surgeon what she is to do in case the tube comes out.

Leeching.—Leeches are used for the purpose of drawing blood from a part. The surface to which they are to be applied must be washed, shaved if necessary, and wiped dry. The leech may be taken between the folds of a towel and applied, or put in a small wine-glass or a test-tube filled with water. The edge of the glass being held close to the part we wish the leech to bite, it will come up out of the water and take hold. If it does not take hold, a drop of blood drawn from the finger and put on the spot will generally cause it to bite. When necessary to remove it, a little salt sprinkled on the head of the leech will make it let go. It should never be pulled off, as it may leave its suckers in the wound and cause inflammation. To stop the bleeding, a pad may be bound on or a little ice applied.

Lightning-stroke is a condition of *shock* and requires the same treatment.

Massage is a series of surface manipulations by means of which the circulation and nutrition of the body, or of a certain part of the body, may be improved. The movements are centripetal,—from the extremities upward,—and are of four kinds: (1) Stroking, or effleurage; (2) friction; (3) kneading, or pétrissage; (4) percussion, or tapotement. To apply massage properly, the special kind applicable to the part should be selected. Stroking, friction, and kneading are used chiefly for increasing the circulation; percussion is used to stimulate the nerves. All the movements should be followed by repeated stroking. Massage should

not be given within two hours after a meal, and never when the patient is menstruating. The temperature of the room should be 70° F. Moderate rubbing causes to grow, much rubbing causes to waste; gentle rubbing loosens, hard rubbing binds. The movements can only be satisfactorily applied after careful practice under a competent teacher.

Poisons are substances capable of destroying life or producing diseased conditions. They are sometimes classified as *irritant*—that is, destroying the tissues with which they come in contact—and *narcotic*, producing insensibility and death by their action on the brain. Another class combines the properties of these two.

Treatment has three things in view: (1) Removal of injurious substances; (2) prevention of their further action when they can not be entirely removed; (3) the treatment for remedying such bad effects as may already have been produced, as a condition of collapse or shock.

To empty the stomach emetics may be used, such as warm water and salt or a tablespoonful of ground mustard stirred into a cup of water. Poking the finger down the throat or tickling the throat with a feather will cause vomiting. After any irritant poison some bland fluid should be given to soothe the injured parts, as white of egg, milk, mucilage and water, gruel, olive or castor oil. For phosphorus and cantharides oil should not be given, as it renders them more readily absorbed.

Substances which prevent or correct the action of a poison are called *antidotes*. Antidotes act either chemically—that is, by forming, in combination with the poison, an insoluble salt which prevents more poison from being absorbed; or physiologically—that is, by correcting the effect produced upon the system. Acids require as antidotes the use of alkalies, while alkalies are neutralized by acids. Every nurse should become familiar with the most common poisonous substances used in medicine and their proper antidotes.

Skin-grafting consists in the application of small pieces

of healthy skin at various points over a raw surface, in order to hasten healing and prevent too great contraction by the formation of a scar. The part from which the skin is to be removed for grafting should be thoroughly sterilized and kept wrapped in sterile dressings until the surgeon is ready to remove the grafts. After their application a piece of sterile gutta-percha tissue will be needed for covering the surface before the other dressings are applied. This is done to prevent the grafts from being removed by clinging to the dressing.

Spinal curvature, or a crooked spine, is the result of disease or weakness of the spinal column. It may be treated by the use of physical exercises which are intended to aid in correcting the deformity; or jackets made of plaster of Paris may be used. The nurse will need to have a large number of bandages ready. The patient should have on a soft, close-fitting, woven shirt. A wad of cotton is placed over the abdomen beneath it, called the "dinner-pad," which is removed after the plaster jacket has set. This allows of the distention of the abdomen after eating. Small pads of cotton should be placed over any bony prominences. The patient may be suspended by Sayre's suspension apparatus, which consists of a curved iron beam to which is attached an adjustable arrangement for holding the head and chin, and straps and bands for the axillæ. To a hook in the centre is attached a compound pulley, the other end of which is fastened to a hook by which it may be hung either from a tripod or from a ring or hook in the ceiling. The patient being fitted into this apparatus, the rope passing through the pulley is drawn upon and the patient slowly raised until only the toes touch the floor. The patient is held in this position until the bandages which form the jacket have been applied. Sometimes strips of zinc or tin are placed between the different layers of bandage to give additional strength.

When the upper part of the spine is involved in disease, an apparatus called a "jury-mast" is adjusted during the appli-

cation of the bandages. To this a head-support is attached, which is intended to keep up the amount of extension of the spine thought desirable by the surgeon.

Strangulated Hernia.—Hernia, or rupture, is a protrusion of any portion of the abdominal contents through an abnormal opening in the wall of the abdomen. Loops of intestines are most frequently found thus protruding into hernial sacs. Such a loop may become twisted or be held by so firm a constriction at the neck of the sac that complete obstruction of the bowel results, causing all the symptoms of obstruction—pain, persistent vomiting, and shock. The vomiting may become fecal if allowed to go on. Early and prompt surgical attention is called for. The surgeon, when called, may attempt at first to reduce the hernia by *taxis*—a series of manipulations for pushing the bowel back into the abdominal cavity, usually carried on after an anæsthetic has been given to thoroughly relax the parts. If this does not succeed, the operation of *herniotomy* will be called for. This is undertaken for the purpose of liberating the constricted bowel or omentum. The preparations for this operation and the after-care will be similar to those called for in any case of abdominal section. A hernia that can be reduced by taxis is called *reducible*; otherwise it is *irreducible*.

The palliative treatment of reducible hernia is the application of properly fitting *trusses*, which must be obtained from an instrument-maker, after being prescribed by a surgeon.

Tracheotomy consists in the making of an opening into the trachea through the anterior part of the neck. The operation is usually performed in diphtheria or membranous croup, when there is danger of suffocation. The patient's clothing is slipped off the upper part of the body; a blanket or sheet is rolled around him in such a way as to envelop the arms and hold them down to the side. The patient is then placed on a firm table with the head thrown back, the shoulders being raised by means of a small pillow or folded sheet. The head

is held firmly. When the trachea is opened, there is a rush of air with the escape of some mucus. Then the silver tracheotomy tube is inserted and secured by tapes which pass through slits on each side of it and are carried around the neck and tied.

The trachea-tube is made double. The inner tube is intended to be removed for cleansing from time to time. The tube must be kept free from membrane. The temperature of the room should be 80° F., and kept moist by the generation of steam. The patient's strength should be kept up by nourishing food and stimulants. Liquid foods in small quantities, given frequently, will be called for. Nutrient enemata may be given in addition to this. Should the tube be suddenly coughed out, it should, if possible, be quickly replaced, being carried down through the edges of the wound. If the nurse can not do this, a soft-rubber catheter may be carried in if possible. If this effort fails, put the patient in the best position for breathing possible, and keep the mucus wiped away from the wound until the doctor comes.

Transfusion is the injecting of blood or a saline solution either directly into the blood-vessels of another person or into the cellular tissue. The amount of fluid injected varies from eight ounces to a pint, or even more. The parts selected are usually the chest, the abdomen, the thigh, or the arm. For transfusion the nurse will need to provide an irrigator which has been sterilized with boiling water or a rubber tube and a glass funnel, also sterilized. The needle used is like a large hypodermic needle, and after sterilization should be fitted into the rubber tubing. The temperature of the fluid to be used should be about 100° to 105° F. Normal salt solution—*i. e.*, six-tenths of one per cent. salt in sterile water—is most commonly used. The place where the needle is to be thrust into the skin, or a vessel opened, should be thoroughly sterilized by the nurse. After the removal of the needle the small wound may be dressed by the application of collodion on cotton or a compress and bandage.

Trephining is an operation performed for the removal of a depressed portion of bone from the skull, or for the removal of brain pressure—*compression of the brain*—from various causes. The nurse should have the patient's scalp entirely shaved and antiseptically prepared as for other operations. The patient should afterward be kept perfectly quiet in the recumbent position, and carefully watched, to see that there is no hemorrhage or that no convulsions occur. *All brain injuries require the room to be kept quiet and dark. The head is kept somewhat elevated, and cold may be ordered to be kept applied. *Concussion of the brain*, the result of a blow upon the head, may cause giddiness, nausea, vomiting, and surgical shock. When the injury is severe, unconsciousness may result. A surgeon should see the case as soon as possible after the accident.

Ulcers.—An ulcer is an open sore. When *healthy*, its surface is covered with small, red granulations and the surrounding skin is not inflamed, showing a bluish line at the edges of the sore. It becomes smaller from day to day, as it is treated by rest and the application of prescribed dressings. An *unhealthy* ulcer is covered with a slough and has a discharge of unhealthy pus, the granulations are swollen, and the margin of the ulcer is inflamed. *Indolent* ulcers are white in appearance, the tissues around are indurated, there is little secretion from the surface, and they are very slow in healing.

Venesection, or phlebotomy, is blood-letting accomplished by opening a vein. A vein at the bend of the elbow is usually opened. To prepare for this a bandage is tied around the arm some little distance above the elbow, sufficiently tight to prevent venous return, but not so tight as to prevent downward arterial flow. The vein thus becomes distended. The arm is then made aseptic for the operator. The operation should always be done with the patient in the semirecumbent position. Removal of the bandage around the arm will stop the flow, and then an antiseptic pad may be

bound over the wound and the limb kept quiet for a day or two. *Arteriotomy*, more seldom performed, is blood-letting from an artery.

Wounds, or injuries to the soft parts of the body, may be *subcutaneous* or freely exposed to the external air, when they are called *open wounds*. They are usually classified as *contused*, *incised*, *lacerated*, *punctured*, and *poisoned*. Subcutaneous contusions are known as *bruises*. For their treatment see Bruises.

Contused wounds are cuts or tears with bruising of the tissues. Such wounds are apt to slough, because of the loss of vitality of the tissues. They are best treated by warm applications rather than cold ones. After thorough cleansing the edges are brought together by suture. *Incised* wounds, or clean cuts, are similarly treated. *Lacerated* wounds are tears or cuts with ragged edges, which may need to be trimmed before they can be brought together. As these injuries often result from machinery, a very thorough cleansing of the wounds by irrigation will be necessary.

Punctured wounds are made with sharp-pointed objects, as pins, needles, tacks, fish-hooks, thorns, splinters, etc. Care must be taken to see that the whole of the object that has penetrated the tissues is removed. If there is any doubt about it, a surgeon should be consulted, so that it may be removed at once, before it sets up irritation by its presence.

Poisoned wounds often result from punctured wounds. They may come from the bites or stings of animals or insects. Any wound may become a poisoned wound if not treated in an aseptic manner. Hence, in preparation for a surgeon's coming, the nurse should cleanse a wound by irrigation and keep it protected by aseptic dressings, hot or cold, according to the requirements of the case.

APPENDIX B.

DIET FOR THE SICK.

LIQUID DIET.

Barley-water.—To one tablespoonful of ground barley add a pint of cold water; let it boil twenty minutes. Strain and keep in a cool place until used.

Toast-milk.—Toast two slices of bakers' bread a dark brown, after drying thoroughly in the oven; boil a pint of milk and pour it over the toast; strain and add either a little salt or sugar. Toast-water is made in the same way, using water instead of milk.

Flaxseed-tea.—To one quart of cold water add one tablespoonful of flaxseed; let simmer three or four hours; strain; add lemon-juice and sugar to taste.

Wine-whey.—When a pint of milk is brought just to a boil, pour in a gill of sherry wine; let it again come to a boil; when the whey separates, strain through gauze. It may be taken either warm or cold.

Rice-water.—Wash one ounce of rice with cold water, then put the washed rice and an inch of cinnamon stick into a double boiler with a pint of boiling water; boil for one hour, strain and sweeten to taste, or a little salt may be added.

Milk-punch.—Sweeten a glass three parts full of new milk to taste, and add one or two tablespoonfuls of brandy or whiskey.

Egg-nogg.—Stir well a heaping teaspoonful of sugar and the yolk of an egg in a glass, and then add a tablespoonful of brandy or whiskey; fill the glass with new milk until it is three parts full, then stir into the mixture the white of the egg beaten to a stiff froth.

Egg-flip.—One egg, four teaspoonfuls of sugar, a glass three parts full of new milk; beat the egg and sugar together until light and stiff, then add to the milk.

Toast-wine.—One slice of well-browned toast, half a pint of boiling water, one teaspoonful of sugar, two tablespoonfuls of wine; put the toast into a pitcher, pour the boiling water over, and let stand until cold; then strain off the water and to it add the sugar and the wine.

Albumen-water.—One pint of cold water, whites of two eggs, juice of one-half lemon, two teaspoonfuls of sugar; shake together in a wide mouth jar with tight-fitting cover, until thoroughly mixed; the sugar may be omitted. Serve iced.

Albumenized Milk.—Shake together in a jar one pint of milk and whites of two eggs until thoroughly incorporated. It may be sweetened and flavored to taste.

Lemon-whey.—Warm one cup of milk and add two tablespoonfuls of lemon-juice; boil together until the curd separates; press the whey from the curd; add sugar to taste. Serve cold.

Toddy.—Half a glass of water, either hot or cold; half a teaspoonful of sugar, four teaspoonfuls of brandy or whiskey; dissolve the sugar in the water and add the brandy or whiskey. If the juice of a lemon be added, it makes lemon-toddy.

Beef-tea.—To one pint of cold water add one pound of chopped lean beef; let boil slowly four hours; strain and salt to taste.

Quick Beef-tea.—One pound of chopped lean beef, half a pint of cold water, saltspoonful of salt; put the meat, water, and salt in a closely covered pan and boil gently ten minutes; stir well, strain, and remove the fat.

Beef-broth.—One quart of cold water, one pound of lean, juicy beef; boil slowly for one hour; add a tablespoonful of rice, and salt to taste; when the rice is tender, strain the broth and serve with strips of dry toast.

Mutton-broth is made in the same manner.

Chicken-broth requires three pounds of chicken to two quarts of cold water.

Oyster-broth.—Cut one pint of oysters into small pieces, put them into a saucepan with half a pint of cold water; boil gently ten minutes; skim, strain, and salt to taste. Serve hot with toasted crackers.

Clam-broth is made in the same way.

Expressed Beef-juice.—Broil or pan lean beefsteak until it is heated through; squeeze the juice out with either a beef-press or a lemon-squeezer; strain through gauze to get the fat off. Before serving, warm the juice in a small cup placed inside a cup of boiling water.

Coffee.—Mix one tablespoonful of ground coffee with enough cold water to form a paste; add one-half pint of boiling water; boil a few minutes, then set it back on the range for a few moments to settle.

Tea.—Allow one small teaspoonful of tea to every cup; add boiling water. Let the teapot stand at the side of the fire without boiling for a short time, about three to five minutes.

Cocoa.—Mix one teaspoonful of cocoa with enough boiling water to form a paste; add a cupful of boiling milk and serve immediately.

Egg-broth.—Beat an egg very light, add half a teaspoonful of sugar and a little salt. Pour on it by degrees one pint of boiling water, stirring constantly to prevent curdling.

Koumiss.—Fill a quart wine-bottle up to the neck with pure milk; add a quarter of a cake of compressed yeast and two tablespoonfuls of white sugar that has been dissolved in a little water over a hot fire. Tie the cork in the bottle

securely and shake the bottle well. Place in a room of a temperature of from 50° to 90° F. for six hours, then in the ice-box overnight.

SEMILIQUID DIET.

Rice-flour Gruel.—Mix two teaspoonfuls of rice-flour with four tablespoonfuls of cold milk; pour this into one pint of boiling milk, stirring all the time; boil gently for fifteen minutes; add sugar or salt to taste.

Oatmeal Gruel.—Stir slowly one-half a cupful of rolled oats into one pint of boiling water; salt to taste and boil for twenty minutes.

Farina Gruel.—Sprinkle slowly one heaping tablespoonful of farina into one pint of boiling water, stirring all the time to prevent lumps; boil for half an hour; add salt to taste.

Meal Ball.—Tie a pint of flour tightly in a piece of stout muslin and boil for nine hours; scrape off the outer crust, and the inside will be found to be a dry ball; grate this as needed, allowing one tablespoonful wet in cold milk to a pint of boiling milk; boil until smooth; add a salt-spoonful of salt.

Corn-meal Gruel.—Stir two even tablespoonfuls of corn-meal into one pint of boiling water; boil gently for half an hour; salt to taste.

PEPTONIZED AND STERILIZED FOODS.

Milk Peptonized by Heat.—Into a clean quart bottle put one measure (5 grs.) of Fairchild's Extractum Pancreatis, and one measure (15 grs.) of bicarbonate of soda, and a gill of cold water; shake; then add a pint of fresh, cold milk and shake the mixture again. Place the bottle in water

about 100° to 115° , or so hot the whole hand can be held in it without discomfort for a minute. Keep the bottle there twenty minutes. At the end of that time put the bottle on ice to check further digestion and keep the milk from spoiling. Peptonized milk may be sweetened, flavored with grated nutmeg, or taken with mineral water. Put the mineral water first into the glass, then quickly pour in the peptonized milk, and drink during effervescence.

Milk Peptonized Cold.—Mix the peptonizing powder in cold water and cold milk as usual, and immediately place the bottle on ice, without subjecting it to the water-bath or any heat. When needed, pour out the required quantity and use in the same manner as ordinary milk.

Peptonized Milk for Jellies, Punches, etc.—Mix the peptonizing powder (*Extractum Pancreatis* and bicarbonate of soda), cold water, and milk in a bottle, and place in a hot-water bath, as directed in recipe for peptonizing milk; let the bottle remain in the hot water for two hours, then pour into a saucepan and heat to boiling. This specially peptonized milk is now ready for jellies, etc. In peptonizing milk for recipes in which lemon-juice or acid is to be used, it is necessary to carry the process to the point at which the milk will curdle with acid. Hence the two hours' digestion. Do not fail to boil the milk immediately after the two hours in water-bath, otherwise the milk will not set into a jelly, as the powder would digest the gelatine.

Sterilized Milk.—Place milk suitably diluted, sweetened, and reinforced by cream in a well-scalded nursing bottle, cork the bottle with cotton, and place in a vessel containing four or five inches of cold water; put the basin upon the fire. When the water begins to boil, consult the clock, and let the boiling go on for ten minutes. Take from the fire and cool off for feeding. In scientific language we describe this process as heating milk and water in a carefully sterilized vessel to 156° F. for six minutes, but practically the simple plan described above has proved sufficient.

Experience shows that the milk of the common red cow is superior, and that the milk of fine-bred cows is more apt to contain tuberculosis bacilli than is the milk of the common red cow.

LIGHT DESSERTS.

Arrowroot Custard.—Mix four tablespoonfuls of Bermuda arrowroot with one gill of cold milk, and pour it slowly into one pint of boiling milk, stirring all the time ; add two teaspoonfuls of sugar, a pinch of salt, and cook for fifteen minutes ; flavor with nutmeg or ten drops of brandy ; pour into a mould to cool. Serve with cream.

Arrowroot Wine Jelly.—Mix two tablespoonfuls of Bermuda arrowroot with four tablespoonfuls of cold water and strain through gauze into half a pint of boiling water, stirring all the time ; add two teaspoonfuls of sugar and simmer for five minutes, or until it looks perfectly clear ; remove from the fire, and stir in two tablespoonfuls of wine or brandy. Pour into a mould to cool.

Arrowroot Gruel.—Mix one tablespoonful of Bermuda arrowroot, a pinch of salt, and half a gill of cold water ; stir into half a pint of boiling water and boil for fifteen minutes.

Cracker Gruel.—Two tablespoonfuls of fine cracker crumbs, $\frac{1}{2}$ of a teaspoonful of salt, one cup of water, one cup of milk ; bring the milk and water to the boiling point, stir in the crumbs and salt ; boil until smooth. Serve hot.

Tapioca Jelly.—Wash one tablespoonful of tapioca thoroughly and soak it in three gills of cold water overnight ; then simmer slowly until clear ; add five teaspoonfuls of sugar and two teaspoonfuls of lemon juice and turn into a mould.

Tapioca Custard.—One tablespoonful of tapioca soaked in two gills of cold water overnight ; boil until clear ; put one gill of milk into a double kettle ; beat together one egg,

one teaspoonful of sugar, $\frac{1}{2}$ of a teaspoonful of cornstarch, and add to the gill of boiling milk; boil until about the consistence of cream; take from the fire and pour it into a bowl to cool; when cool, stir in the stiff beaten white of an egg and the tapioca, and serve cold. Sago may be used in place of tapioca if desired.

Farina Custard.—Into two gills of boiling milk sprinkle one tablespoonful of farina, stirring all the time; boil for twenty minutes; then add the beaten yolk of one egg and one teaspoonful of sugar; let boil again and stir in the stiff beaten white of the egg; take from the fire, add a few drops of lemon or vanilla, if allowed, and turn out to cool.

Rice Snow.—Wash one tablespoonful of rice and boil until tender in a double boiler; add one tablespoonful of milk, one teaspoonful of sugar, a few drops of vanilla; while boiling, stir in the stiff beaten white of one egg. Serve with cream either hot or cold.

Bread Pudding.—Put one gill of dry bread crumbs into a small baking dish; pour two gills of boiling milk over them, cover close, and set aside to cool; beat together one heaping teaspoonful of sugar and one egg until very light, and stir into the bread and milk, which should be nearly cold; flavor with nutmeg and bake in a quick oven for twenty minutes. Serve hot with cream.

Rice Pudding.—Wash $\frac{1}{3}$ of a cup of rice well; butter a pudding dish and stir in the rice, one pint of milk, and one tablespoonful of sugar; add a pinch of salt; grate nutmeg over it and bake for one and a half hours.

Cornstarch Pudding.—Boil two gills of milk in a double kettle; dissolve one tablespoonful of cornstarch in a little cold milk and add to the boiling milk; boil for five minutes and then add the beaten yolk of one egg, one teaspoonful of vanilla, and one tablespoonful of sugar; turn into a buttered dish and bake in the oven for fifteen minutes; beat the white of the egg and a tablespoonful of pulverized sugar together

until very light, spread over the pudding, and brown lightly in the oven. Instead of adding the yolk and baking the pudding, after adding the sugar and flavoring, stir in the well-beaten white of the egg, turn into a wet cup, and serve in a custard made of the yolk in this way : Into one gill of boiling milk stir $\frac{1}{2}$ of a teaspoonful of cornstarch dissolved in one tablespoonful of milk ; add the well-beaten yolk of the egg and $\frac{1}{2}$ of a teaspoonful of sugar ; boil for five minutes ; flavor with lemon or vanilla.

Tipsy Pudding.—Half fill a small glass dish with stale sponge cake ; mix together a tablespoonful of wine and a tablespoonful of boiling water, and pour over the cake ; then fill the dish with custard made according to above recipe.

Tapioca and Fruit.—Wash a tablespoonful of tapioca and soak over night in three gills of cold water ; then cook slowly until smooth and clear ; add the juice of half a lemon, a teaspoonful of vanilla, and sugar to taste ; place about a dozen large strawberries in a dish and pour the hot tapioca over them ; then put on ice until ready to serve. Sliced peaches, raspberries, or bananas may be used in the same manner.

Egg Junket.—Beat one egg very light ; add one teaspoonful of sugar, $\frac{1}{2}$ of a teaspoonful of vanilla, and two gills of lukewarm milk ; put it into the dish it is to be served in and stir in one teaspoonful of rennet.

Chocolate Pudding.—Make a cornstarch pudding according to recipe given ; when sufficiently boiled, add one tablespoonful of grated chocolate ; put the white of egg, beaten stiff with one tablespoonful of pulverized sugar, on top and brown slightly in oven.

Whipped Cream.—Mix together two gills of rich cream, $\frac{1}{2}$ of a cup of pulverized sugar, two tablespoonfuls of sherry wine ; put on ice for an hour, as cream whips much better if chilled ; whip with an egg-beater, and as the froth rises, skim it off and lay it on a sieve to drain, returning the cream

which drips away to be whipped over again. Place on the ice a short time before serving.

Lemon Jelly.—Cover one-third of a box of Nelson's gelatine with cold water and let it soak for fifteen minutes; then add one cup of sugar, juice of one lemon, and two gills of boiling water; stir until the sugar is dissolved; strain through gauze and stand on ice to harden.

Wine Jelly.—Wine jelly is made the same way, adding one gill of port or sherry wine instead of lemon juice.

Cup Custard.—Beat one egg until light; add one teaspoonful of sugar; beat again; add $1\frac{1}{2}$ gills of milk and nutmeg to taste, and stir until the sugar is dissolved; pour into a buttered cup, place the cup in a pan of boiling water, and place in the oven. Bake until the custard sets; then set away to cool.

Savory Custard.—Heat one small cup of chicken or beef broth, seasoned. Beat up one egg until light, and when the broth boils pour it on the egg. Stir thoroughly and pour it into a cup. Tie a paper over the cup and steam the custard seventeen minutes in a covered boiler.

Boiled Custard.—Beat one egg to a froth; add one tablespoonful of sugar and a little salt; mix well; add one cup of scalded milk and stir over boiling water until it thickens. Serve cold.

MISCELLANEOUS RECIPES.

Baked Potatoes.—Select potatoes of same size; wash them well; bake in a clean, hot oven from thirty to forty minutes, or until soft; break the skins to let the steam inside escape. Serve as soon as done.

Croutons.—Cut stale bread into half-inch slices; cut off the crust and cut into half-inch cubes; put them on a shallow pan and bake until brown. Use with beef-tea or broth.

Baked Apples.—Wipe the apples, remove the core, and put them in a pan; put sugar in the center of each apple and enough water to cover the bottom of the pan; bake in a hot oven until soft, but not broken.

Baked Crackers.—Split round crackers in halves, spread the inside with butter; put them buttered side up into a pan and brown in a hot oven. Grated cheese or small pieces of cheese may be used in place of butter.

Raw Beef Sandwich.—Scrape a small piece of round steak, removing all fibers and connective tissue; season slightly with salt and cayenne pepper, if allowed. Spread on thin slices of bread and butter, arrange as sandwiches, and cut in narrow strips or shapes. Chopped parsley or a little fruit jelly may be mixed with the meat.

Soft-boiled Eggs.—Cook three minutes in boiling water.

Hard-boiled Eggs.—Cook them twenty minutes in water just bubbling; then the yolk is dry, mealy, and easily digested.

Milk Toast.—Dip a slice of dry toast in boiling milk which has a piece of butter dissolved in it.

Water Toast.—Dip a slice of dry toast in salted boiling water; spread with butter and serve very hot.

Fricaseed Oysters.—One cup of milk, $\frac{1}{2}$ of a cup of oyster liquor. When boiling, add one teaspoonful of flour and $\frac{1}{2}$ of a teaspoonful of butter rubbed together; cook until it thickens, then add one dozen oysters; cook until the oysters are plump and the edges curl; serve immediately, plain or on toast.

Stewed Oysters.—Put a pint of oysters in a pan and heat until the edges curl; then add one cup of boiling milk that is salted to taste; butter and pepper may be added if allowed.

Broiled Steak.—Remove the bone and cut off the fat of a tender piece of steak; broil over a clear fire, turning the broiler every ten seconds; if it is to be rare, cook for four minutes. Serve on a hot plate with butter, salt, and pepper.

Panned Mutton Chops.—Have the frying-pan hissing hot without any fat ; take off the pink skin and outer fat of a chop, put it in the pan, and cook one minute ; turn and sear on the other side, then cook more slowly until done—if rare, five minutes will be long enough ; when nearly done, sprinkle a little salt on each side. Drain on paper and serve very hot without a drop of grease.

APPENDIX C.

WEIGHTS AND MEASURES.

FLUID MEASURE.

℥ 60	=	ƒ ℥ j
ƒ ℥ viij	=	ƒ ℥ j
ƒ ℥ xvj	=	Oj
Oviij	=	Cj.

APOTHECARIES' MEASURE.

gr. xx	=	℥ j
℥ iij	=	℥ j
℥ viij	=	℥ j
℥ xij	=	lb. j.

DOMESTIC MEASURES.

1 teaspoonful, about 1 fluidrachm	=	ƒ ℥ j
1 tablespoonful, " 1/2 fluidounce	=	ƒ ℥ ss
1 wineglassful, " 2 fluidounces	=	ƒ ℥ ij
1 teacupful, " 4 fluidounces	=	ƒ ℥ iv
1 coffeecupful " 8 fluidounces	=	ƒ ℥ viij.

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